CHAPTER 8

ALTERNATIVE INVESTMENTS PORTFOLIO MANAGEMENT

Jot K. Yau, CFA  
Seattle University  
Seattle, Washington  
and  
Strategic Options Investment Advisors Ltd  
Hong Kong

Thomas Schneeweis  
Alternative Investment Analytics  
Amherst, Massachusetts

Thomas R. Robinson, CFA  
TRRobinson and Associates  
Coral Gables, Florida

Lisa R. Weiss, CFA  
Black Knight Ventures, Inc.  
Tampa, Florida

1. INTRODUCTION

Today, many defined-benefit (DB) pension funds, endowments, foundations, and high-net-worth individuals allocate money to alternative investments in proportions comparable to
those given to traditional assets, such as bonds and common equities. In doing so, such
investors may be seeking risk diversification, greater opportunities to apply active management
skills, or both. Portfolio managers who understand alternative investments have a substantial
advantage over those who do not.

This chapter presents six groups of alternative investments: real estate, private equity,
commodities, hedge funds, managed futures, and distressed securities. These six diverse asset
groups cover a wide spectrum of risk and return characteristics and are the major alternative
asset classes in the portfolios of most institutional and individual investors.

This chapter focuses on the distinguishing investment characteristics of alternative
investments and their potential contributions in a portfolio context. Among the questions we
will address in this chapter are the following:

• What types of investments are available in each market, and what are their most important
differences for an investor?
• What benchmarks are available to evaluate the performance of alternative investment
managers, and what are their limitations?
• What investment strategies and portfolio roles are characteristic of each alternative invest-
ment?
• What should due diligence cover? (Due diligence is the investigation into the details of
a potential investment, including the scrutiny of operations and management and the
verification of material facts.)

The chapter is organized as follows: Section 2 introduces and presents an overview of the
field of alternative investments. In Sections 3 through 8, we present the six alternative asset
groups. For each group, we discuss the market for the investments; benchmarks and historical
performance, with a focus on the group’s record as a stand-alone investment; the portfolio role
of the investments and specific strategies; and issues in performance evaluation and reporting.

2. ALTERNATIVE INVESTMENTS: DEFINITIONS,
similarities, and contrasts

Alternative investments comprise groups of investments with risk and return characteristics
that differ markedly from those of traditional stock and bond investments. Common features
of alternative investments include

• Relative illiquidity, which tends to be associated with a return premium as compensation.
• Diversifying potential relative to a portfolio of stocks and bonds.
• High due diligence costs for the following reasons: investment structures and strategies
may be complex; evaluation may draw heavily on asset-class, business-specific, or other
expertise; reporting often lacks transparency.
• Unusually difficult performance appraisal because of the complexity of establishing valid
benchmarks.

In addition, many professional investors believe that alternative investment markets are
informationally less efficient than the world’s major equity and bond markets and offer greater
scope for adding value through skill and superior information.
Historically, real estate (ownership interests in land or structures attached to land), private equity (ownership interests in non-publicly-traded companies), and commodities (articles of commerce such as agricultural goods, metals, and petroleum) have been viewed as the primary alternatives to traditional stock and bond investments. However, in recent years, additional investments—hedge funds (relatively loosely regulated, pooled investment vehicles) and managed futures (pooled investment vehicles in futures and options on futures, frequently structured as limited partnerships)—have increasingly been considered “modern alternatives,” not only to traditional investments but also to traditional alternative investments. The modern alternative investments are more akin to investment or trading strategies than to asset classes. Exhibit 8-1 shows alternative investments grouped according to these distinctions. In some instances, placement of an alternative investment in more than one category can be justified. For example, we discuss distressed securities investing separately as a distinct type of alternative investment, but it could be classified differently.¹

In addition to the traditional-or-modern distinction, we can place alternative investments in three groups by the primary role they usually play in portfolios:

- **Investments that primarily provide exposure to risk factors not easily accessible through traditional stock and bond investments.** Real estate and (long-only) commodities might be included in this group.
- **Investments that provide exposure to specialized investment strategies run by an outside manager.** Hedge funds and managed futures might be placed in this category. Any value added by such investment is typically heavily dependent on the skills of the manager.
- **Investments that combine features of the prior two groups.** Private equity funds and distressed securities might be included in this group.

¹Distressed securities/bankruptcy investing can be classified (1) within private equity if private debt is considered to be private equity, (2) as a subcategory of event-driven strategies under hedge funds as an alternative investment strategy, or (3) as a separate alternative investment strategy. In this chapter, we introduce it as an event-driven substrategy of hedge funds, but we discuss it separately in Section 8.
However we group them, success in the field of alternative investments requires discipline. The portfolio management process still applies. In addition, familiarity with quantitative approaches to the management of risks in alternative investing, in particular risk budgeting, and with nontraditional measures of risk can be helpful. Thus, the chapter on risk management is useful collateral reading.

### EXAMPLE 8-1 Alternative Investments in a Low-Return Environment

Interest in alternative investments from institutional investors soared after the severe equity bear markets of the first years of the twenty-first century. The resulting investment environment for traditional investments was seen as “low return.” Return expectations for equities were widely ratcheted down from pre-bear-market and long-term historical levels. In that environment, using the revised capital market expectations and established strategic asset allocations, many investors foresaw built-in shortfalls relative to return requirements. The problem was particularly acute for DB pension funds in countries such as Canada and the United States, where such funds have traditionally had a strong equity orientation. With declining interest rates increasing the present value of liabilities, many DB plans faced severe pressures.

The experience led a number of industry leaders to question prior investment practices in areas such as strategic asset allocation and to reexamine the role of alternative investments in meeting return objectives and, to a lesser degree perhaps, in controlling risk. Many institutional investors made new and/or higher allocations to alternative investments. Vehicles such as hedge funds proliferated to meet the demand. This trend raised issues of capacity—that is, given the market opportunities, the ability of alternative investment managers to meet performance expectations with more assets.2

In the private wealth marketplace, alternative investments also began to be packaged and marketed to new segments, such as the “mass affluent,” raising issues of suitability and appropriate due diligence processes for such investors.3

Who are the major investors in alternative investments? The list includes both high-net-worth individuals (who were among the pioneer investors in hedge funds) and institutional investors, although banks and insurers may face regulatory restrictions and the investment policy statements of other investors may have self-imposed limitations. The themes already mentioned play varying roles for different investors. The potential risk-diversification benefits of alternative investments have broad appeal across investor types. The possibility of enhancing

---

2See Christopher Wright, “Ripe for the Picking,” *CFA Magazine*, September/October 2005, pp. 27–35. The article’s title refers to the question it colorfully posed: Does alpha grow on trees, and if so, is it being overharvested?

3Mass affluent is an industry term for a segment of the private wealth marketplace that is not sufficiently wealthy to command certain individualized services (such as separately managed accounts) at many investment counseling firms. In the United States as of this writing, individuals with investable assets between US$100,000 and US$1 million would fall in this group.
returns also draws many investors to seriously consider alternative investments. Illiquidity is a limiting factor in the size of the allocation to alternative investments for investors with short investment horizons. In contrast, investors with long investment horizons, such as endowments and some DB pension funds, may be competitively well placed to earn illiquidity premiums and to make large allocations.

The costs of due diligence in alternative investments may be a limiting factor for smaller portfolios. Deutsche Bank’s Equity Prime Services Group 2004 Institutional Alternative Investment Survey, with a range of respondents serving the institutional and private markets, was revealing. In the case of hedge funds, the survey found that one major investor segment, pension funds, evaluates 40 managers, on average, to make only one to three allocations per year. Another major segment, endowments, researches 90 managers, on average, to make four to six placements per year. Sixty percent of respondents took three months to complete due diligence on a hedge fund.4 In alternative investments as in traditional investments, expenses—whether management fees or trading or operational expenses—require justification and management.

For both traditional and alternative investments, selecting active managers is a process of attempting to identify superiorly skilled or informed managers. As Example 8-2 illustrates, the set of questions the investor needs to raise in selecting active managers in any investment field has a compellingly simple logic.

EXAMPLE 8-2  How One University Endowment Evaluates Alternative Investments

The University of Virginia Investment Management Company (UVIMCO) was responsible for the investment of more than US$2.5 billion in assets as of the end of 2005. With a policy portfolio at that time giving more than a 50 percent target weighting to hedge funds, private equity, and real assets as a group, UVIMCO has accumulated considerable experience in alternative investments portfolio management. Notably, the framework of questions to which UVIMCO seeks answers applies not only to alternative investments but also to active managers in general, reflecting the unity of the investment process.5 The chief investment officer (CIO) of UVIMCO, Christopher J. Brightman, CFA, summarized the chief points of UVIMCO’s active manager selection process as follows:6

1. Market opportunity: What is the opportunity and why is it there? We start by studying capital markets and the types of managers operating within those markets. We identify market inefficiencies and try to understand their causes, such as regulatory structures or behavioral biases. We can rule out many broad groups of managers and strategies by simply determining that the degree of

---

4As reported by Jones (2005).

5UVIMCO has a focus on active management (www.virginia.edu/uvimco/IPS.htm). For investors with passive and active investment components, the first major heading in “market opportunity” might be expanded to strategy/product/market opportunity to cover, in addition to market opportunity, questions such as “Is the product what it claims to be?” that a passive investor would explore.

6Based on a communication of December 19, 2005.
market inefficiency necessary to support a strategy is implausible. Importantly, we consider a past history of active returns meaningless unless we understand why markets will allow those active returns to continue into the future.

2. Investment process: Who does this best and what’s their edge? We identify groups of managers that seek to exploit these inefficiencies. Few, if any, important opportunities are exploited by a single manager. We study investment process and identify best practice and competitive advantages among similar managers.

3. Organization: Are all the pieces in place? Is the firm well organized and stable? Are research, trading, risk management, and operations properly staffed given the investment process and scale? Is compensation fair? Has there been turnover? What is the succession plan?

4. People: Do we trust the people? We speak at length to the principals face to face. We look for experience, intelligence, candor, and integrity. Then, we do reference checks; we speak to former bosses, colleagues, and business partners as well as current and past clients. We have real conversations with people who know the managers well and are willing to speak openly and at length. We also perform general Google and LexisNexis searches.

5. Terms and structure: Are the terms fair? Are interests aligned? Is the fund or account structured appropriately to the opportunity? How much money can or should be invested in the space? Details here vary by market, asset class, and strategy.

6. Service providers: Who supports them? We verify lawyers, auditors, prime brokers, lenders, etc. We investigate those with whom we are not familiar.

7. Documents: Read the documents! We read the prospectus or private placement memorandum. If we do not understand everything in the documents, we hire lawyers who do. We also read the audits.

8. Write-up: Prior to making a manager selection decision, we produce a formal manager recommendation discussing the above steps. The write-up ensures organized thought, informs others, and formally documents the process.

Some questions in due diligence and alternative investment selection are unique, or more acute, for advisers of private wealth clients than for institutional investors. These include:

- **Tax issues.** This is a pervasive issue in investing for individuals. In contrast to equities and bonds, with alternative investments, the adviser will frequently be dealing with partnerships and other structures that have distinct tax issues.

- **Determining suitability.** This is often more complex for an adviser to an individual client or family than for an institutional investor. The adviser often addresses multistage time horizons and liquidity needs. Client-relevant facts—for example, the time horizon—may change more suddenly than for, say, a pension fund with thousands of participants. The private client adviser also may be faced with questions of emotional as well as financial needs.

- **Communication with client.** When the adviser explores the suitability of an alternative investment with a client as part of his or her fiduciary responsibilities, the adviser will often discuss suitability with the client. The adviser then faces the difficult problem of communicating and discussing the possible role in the portfolio (and risk) of an often complex investment with a nonprofessional investor.
• Decision risk. As used by one authority on investing for private wealth clients, **decision risk** is the risk of changing strategies at the point of maximum loss.\(^7\) Many advisers to private wealth clients are familiar with the issue of clients who are acutely sensitive to positions of loss at stages prior to an investment policy statement’s stated time horizon(s). Of course, advisers need to do continuing evaluation of investments, but the point is that the adviser needs to evaluate whether an alternative investment not only promises to be rewarding over a given time horizon but is also acceptable at all intermediate points in time.\(^8\) In effect, the issue relates to downside risk at all points within a time horizon and investors’ reactions to it. Many alternative investments—for example, many hedge fund strategies—have complex risk characteristics. Decision risk is increased by strategies that by their nature have:
  - Frequent small positive returns but, when a large return occurs, it is more likely to be a large negative return than a large positive one\(^9\) or
  - Extreme returns (relative to the mean return) with some unusual degree of frequency.\(^10\)

• **Concentrated equity position of the client in a closely held company.** For some clients, ownership in a closely held company may represent a substantial part of wealth. The adviser needs to be particularly sensitive to an investment’s effect on the client’s risk and liquidity position. For example, is a private equity fund suitable for the investor? The issues of concentrated risk and illiquidity also arise for concentrated positions in public equities with built-in capital gains, although hedging and monetization strategies are available. (These strategies are discussed in the chapter on monitoring and rebalancing.) Although a client’s residences are often viewed separately from the client’s investable portfolio, a similar issue arises in real estate investment vis-à-vis wealth represented by residences. Problems of this type form an interface of suitability, tax, and asset allocation issues.

In discussing individual alternative investments, we will sometimes provide a perspective on what effect an alternative investment would have on the risk and expected return characteristics of a stock/bond portfolio in which some of the money is shifted to the alternative investment. In some cases, we can also refer to evidence on the effects of the addition of the new alternative investment to a portfolio that already includes stocks, bonds, and a different major alternative investment. This approach reflects the situation faced by many investors and is a type of exercise that can be informative.

In many cases, we give evidence based on data relating to the period 1990 to 2004.\(^11\) **Here a caution is appropriate.** In any forward-looking exercise, the investor needs to evaluate the differences between current or forecasted economic fundamentals and those of any selected

---

\(^7\)See Brunel (2004).

\(^8\)Brunel (2003).

\(^9\)Technically, such a strategy would be said to have **negatively skewed returns**.

\(^10\)Technically, such a strategy would be said to have **high kurtosis**. To summarize using the language of statistics, many investors are presumed to want **positive skewness** and **moderate or low kurtosis** (the standard for moderate is the kurtosis of a normal distribution). For more details on these statistical concepts, see Chapter 3 of DeFusco (2004). In discussions of alternative investments in trade publications as well as in outlets such as the *Financial Analysis Journal* and the *Journal of Wealth Management*, the practitioner will encounter these statistical terms, which are covered in the CFA Institute’s curriculum, and we will use them occasionally in this chapter.

\(^11\)Hedge funds have reliable data going back only to 1990. We chose to be consistent on the starting point for the sake of comparability across investment types.
historical period used in the analysis. In addition, the results for any relatively short period can be affected by short-term dislocations, such as currency crises.

Overall, the 1990 to 2004 period was a time of historically low and stable or declining interest rates and inflation in the United States and many developed markets. The beginning year was recessionary in the United States. A long expansion followed in the United States and many developed countries (with the notable exception of Japan), but at least three dislocations with worldwide effects occurred. In the United States and some other major markets, an exceptionally long equity bull market (1991 to 1999 inclusive) was followed by an extended bear market. The year 2001 was recessionary in the United States, whereas 2002 to 2004 were recovery years. The period 1990 to 2004 covers one full business cycle for the United States and many developed markets.

EXAMPLE 8-3 Alternative Investments and Core–Satellite Investing

A way of thinking about allocating money known as core satellite seeks to define each investment’s place in the portfolio in relation to specific investment goals or roles. A traditional core–satellite perspective places competitively priced assets, such as government bonds and/or large-capitalization stocks, in the core. Because alpha is hard to obtain with such assets, the core may be managed in a passive or risk-controlled active manner. (Informally, alpha is the return to skill.) In the satellite ring would go investments designed to play special roles, such as to add alpha or to diminish portfolio volatility via low correlation with the core. Alternative investments would be in the satellite ring for most investors.

In a 2005 paper, Leibowitz and Bova championed an alternative position that would place alternative investments in an “alpha core” at their maximum allowable percentages and then add stocks and bonds as “swing assets” to get a portfolio that best reflected the desired balance between return and risk. The traditional viewpoint takes traditional assets as the centerpiece, whereas the Leibowitz–Bova position builds the portfolio around alternative investments. The Leibowitz–Bova perspective is an example of the ferment in investment thinking mentioned in Example 8-1.

Having provided a bird’s-eye view of the field of alternative investments, we use the following sections to analyze each in detail, beginning with real estate.

---

12The dislocations were the Mexican currency crisis of 1994, the Asian financial crisis of 1997, and the Russian debt crisis of 1998.
13U.S. equities experienced a record nine-year string of positive-return years (1991–1999), including six years (1991 and 1995 to 1999) of plus 20 percent returns. This period was followed by a post-1941 record string of three negative-return years (2000 to 2002).
15In the Leibowitz–Bova approach, the term alpha in alpha core strictly refers not to a return to skill or risk-adjusted excess return, as in standard finance theory, but to a type of return–risk enhancement that may be available relative to a more traditional asset allocation approach.
Chapter 8 Alternative Investments Portfolio Management

3. REAL ESTATE

As one of the earliest of the traditional alternative investments, real estate plays an important role in institutional and individual investor portfolios internationally. The focus of our discussion is equity investments in real estate (covered in the definition given earlier). Investing in such instruments as mortgages, securitizations of mortgages, or hybrid debt/equity interests (e.g., mortgages in which the lender’s interest includes participation in any appreciation of the underlying real estate) are not covered here.

3.1. The Real Estate Market

Both individual and institutional investors have had long-standing involvement in the real estate market. For centuries, individual investors have owned interests in real estate, primarily in the form of residential and agricultural properties. In the United States, institutional investors ventured into real estate in the late 1970s and early 1980s as they sought to diversify their portfolios and hedge against inflation. By the late 1980s, the performance of real estate had become lackluster as a result of volatile changes in U.S. tax policies, deregulation in the savings and loan industry, and the onset of risk-based capital regulations. These events culminated in the real estate crash of the late 1980s and early 1990s. Outside the United States, real estate investment has always been an important part of institutional as well as individual portfolios. At the beginning of the twenty-first century, individual and institutional investors continue to focus on the potential return enhancement and risk-diversification benefits of real estate investments in a portfolio of stocks, bonds, and frequently, other alternative investments.

3.1.1. Types of Real Estate Investments

Investors may participate in real estate directly and indirectly (which is sometimes called financial ownership). Direct ownership includes investment in residences, business (commercial) real estate, and agricultural land. Indirect investment includes investing in:

- Companies engaged in real estate ownership, development, or management, such as homebuilders and real estate operating companies (which are in the business of owning such real estate assets as office buildings); such companies would be in the Global Industrial Classification System’s (GICS) and FTSE Industry Classification Benchmark’s real estate management and development subsector.
- Real estate investment trusts (REITs), which are publicly traded equities representing pools of money invested in real estate properties and/or real estate debt.
- Commingled real estate funds (CREFs), which are professionally managed vehicles for substantial commingled (i.e., pooled) investment in real estate properties.
- Separately managed accounts, which are often offered by the same real estate advisers sponsoring CREF.
- Infrastructure funds, which in cooperation with governmental authorities, make private investment in public infrastructure projects—such as roads, tunnels, schools, hospitals, and airports—in return for rights to specified revenue streams over a contracted period.

Investments in real estate management and development subsector shares and in REITs are both made through the public stock markets. REITs, however, unlike real estate management and development shares, essentially function as conduits to investors for the cash flows from the underlying real estate holdings. The list of markets in which REITs are available includes...
Australia, Belgium, Canada, China, France, Hong Kong, Japan, the Netherlands, Singapore, South Korea, and the United States.

**Equity REITs** own and manage such properties as office buildings, apartment buildings, and shopping centers. Shareholders receive rental income and income from capital appreciation if the property is sold for a gain. **Mortgage REITs** own portfolios in which more than 75 percent of the assets are mortgages. Mortgage REITs lend money to builders and make loan collections; shareholders receive interest income and capital appreciation income from improvement in the prices of loans. **Hybrid REITs** operate by buying real estate and by acquiring mortgages on both commercial and residential real estate.

REITs securitize illiquid real estate assets; their shares are listed on stock exchanges and over the counter. REITs permit smaller investors to gain real estate exposure. Exchange-traded funds, mutual funds, and traded closed-end investment companies allow investors to obtain a professionally managed diversified portfolio of real estate securities with a relatively small outlay. CREI's include open-end funds and closed-end funds (i.e., funds that are closed to new investment after an initial period). Institutional and wealthy individual investors use these private real estate funds to access the real estate expertise of a professional real estate fund manager in selecting, developing, and realizing the value of real estate properties. In contrast to open-end funds, closed-end funds are usually leveraged and have higher return objectives; they operate by opportunistically acquiring, repositioning, and disposing of properties. Individually managed separate accounts are also an important alternative for investors.

In an infrastructure investment, a private company—or, more frequently, a consortium of private companies—designs, finances, and builds the new project (e.g., a road or hospital) for public use. The consortium maintains the physical infrastructure over a period that often ranges from 25 to 30 years. The public sector (via the government) leases the infrastructure and pays the consortium an annual fee for the use of the completed project over the contracted period. Thus, the public sector avoids the need to issue debt or raise taxes to finance infrastructure development. The public sector staffs the infrastructure and ensures safety. The projects are financed through bond issuance by the consortium as well as by an equity investment. The consortium will often want to pull its equity capital out of a project for reinvestment in other projects. It can do this by selling its interest to investors through a variety of investment structures. Public/private infrastructure investment has been classified under real estate, under private equity, and also as a distinct alternative investment class. Infrastructure investment was pioneered in the United Kingdom in 1992 (as the Private Financing Initiative) and is a rapidly growing alternative investment segment in North America, Western Europe, and Asia. One estimate as of early 2006 is that in the United Kingdom alone, there are more than 700 public/private infrastructure projects totaling US$100 billion in value.16

3.1.2. Size of the Real Estate Market

Estimates have been made that real estate represents one third to one half of the world’s wealth, although figures are hard to document. In the United States, as of the end of 2005, real estate owned by households was valued at US$19.8 trillion and represented approximately one third of total assets (tangible and financial) of U.S. households.

According to one report, U.S. real estate held in U.S. investment portfolios is estimated to be worth US$4.5 trillion.17 According to the National Association of Real Estate Investment Trusts (NAREIT), the market capitalization of all publicly traded REITs in the United States

---

17 See Broad (2005).
was more than US$300 billion in 2004 and the market capitalization of REITs traded in Canada was about US$13 billion in the same year.

### 3.2. Benchmarks and Historical Performance

In this section, we discuss the performance measurement of real estate investments by using publicly available information. Performance of private equity in real estate may vary and does not necessarily correlate closely with the benchmarks discussed here. More importantly, it has been observed that the real estate market lags behind publicly traded real estate securities.

#### 3.2.1. Benchmarks

Exhibit 8-2 shows some of the popular real estate indices for selected countries. The principal benchmark used to measure the performance of direct real estate investment in the United States is the National Council of Real Estate Investment Fiduciaries (NCREIF) Property Index. The NCREIF Index is a quarterly benchmark for real estate covering a sample of commercial properties owned by large U.S. institutions. The NCREIF Index is essentially value weighted and includes subindices grouped by real estate sector (apartment, industrial, office, and retail) and geographical region. Property appraisals largely determine the values in the NCREIF Index because real estate properties change ownership relatively infrequently. Property appraisals are also conducted infrequently (typically once a year), so appraisal-based property values exhibit remarkable inertia. Therefore, returns calculated solely on percentage changes in the index suffer from a number of deficiencies, including the tendency to underestimate volatility in underlying values.\(^{18}\) However, methods have been developed to “unsmooth” or correct for this bias.\(^{19}\) Recently, a transaction-based index has been developed based on NCREIF data and the use of econometrics to address the issue of infrequent market transactions.

The principal benchmark used to represent indirect investment in real estate is the index compiled by the NAREIT. Begun in 1972, the NAREIT Index is a real-time, market-cap-weighted index of all REITs actively traded on the New York Stock Exchange and American Stock Exchange. NAREIT also computes a monthly index based on month-end share prices of REITs that own and manage real estate assets, or equity REITs. NAREIT publishes several other indices, including a monthly index of REITs that specialize in acquiring various types of mortgage loans on many types of properties (mortgage REITs) and a monthly index based on share prices of hybrid REITs, which operate by buying real estate and by acquiring mortgages on both commercial and residential real estate. REIT indices are also published by various institutions, such as Standard & Poor’s, Dow Jones, Wilshire Associates, and Morgan Stanley. The FTSE EPRA/NAREIT Global Real Estate Index listed in Exhibit 8-2 is an example of a global index of securitized real estate investment.

Both direct and indirect investments have significant measurement issues associated with them.

#### 3.2.2. Historical Performance

In the United States, direct and indirect real estate investments as represented by the major indices produced better risk-adjusted performance over the 1990 to 2004 period than did general stocks and commodities, as shown in Exhibit 8-3. In Exhibit 8-3, the “hedged” REIT return series has been purged of its overall equity market

\(^{18}\)For details of the deficiencies, see Geltner (2000) and Geltner and Ling (2001).

\(^{19}\)The approach used to unsmooth the NCREIF Index is based on the assumption that real estate returns follow a first-order autoregressive process as described in CISDM (2005a).
EXHIBIT 8-2  Selected Real Estate Benchmarks

<table>
<thead>
<tr>
<th>Country</th>
<th>Name</th>
<th>Type</th>
<th>Begin Date</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Property Council of Australia index (PCA)</td>
<td>Appraisal based</td>
<td>1984</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Canada</td>
<td>Institute of Canadian Real Estate Investment Managers (ICREIM)/IPD Canadian Property Index</td>
<td>Appraisal based</td>
<td>1985</td>
<td>Quarterly</td>
</tr>
<tr>
<td>France</td>
<td>Investment Property Databank (IPD)</td>
<td>Appraisal based</td>
<td>1998</td>
<td>Quarterly and monthly</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>IPD</td>
<td>Appraisal based</td>
<td>1980</td>
<td>Quarterly and monthly</td>
</tr>
<tr>
<td>United States</td>
<td>NCREIF Property Index</td>
<td>Individual properties; appraisal based</td>
<td>1978</td>
<td>Quarterly</td>
</tr>
<tr>
<td></td>
<td>Transaction-Based Index (TBI) for Institutional Commercial Property Performance (MIT Center for Real Estate)</td>
<td>Individual properties; based on transaction prices of properties sold from the NCREIF Index database</td>
<td>1984</td>
<td>Quarterly</td>
</tr>
<tr>
<td></td>
<td>S&amp;P REIT Composite Index</td>
<td>REIT's</td>
<td>1997</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td>NAREIT Index</td>
<td>REIT’s</td>
<td>1972</td>
<td>Real time</td>
</tr>
<tr>
<td></td>
<td>Morgan Stanley REIT’s Index</td>
<td>REIT’s</td>
<td>1996</td>
<td>Real time</td>
</tr>
<tr>
<td></td>
<td>Wilshire real estate indices</td>
<td>REIT’s and real estate operating companies</td>
<td>1978</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td>Dow Jones REIT indices</td>
<td>REIT’s</td>
<td>1998</td>
<td>Real time</td>
</tr>
<tr>
<td>World</td>
<td>FTSE EPRA/NAREIT Global Real Estate Index</td>
<td>REIT’s and real estate operating companies</td>
<td>1989</td>
<td>Daily</td>
</tr>
</tbody>
</table>


return component, as represented by the S&P 500 Index. Such an adjustment is meaningful only for equity REITs because mortgage and hybrid REITs have different risk characteristics. However, equity REITs represent close to 95 percent of the composition of the index.20 GSCI is the Goldman Sachs Commodity Index, discussed further in the section on commodities. Note that the NCREIF Index represents nonleveraged investment only. In contrast, debt often represents 50 percent or more of the capital structure of REITs, so REITs are a levered exposure to real estate. This contrast is important for understanding the higher standard

---

20The data and methodology are described in CISDM (2005).
## EXHIBIT 8-3  
Real Estate Performance, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>NAREIT Index</th>
<th>NAREIT Index Hedged</th>
<th>NCREIF Index</th>
<th>NCREIF Index Unsmoothed</th>
<th>S&amp;P 500 Index</th>
<th>Lehman Aggregate Bond Index</th>
<th>Lehman Aggregate Bond Index</th>
<th>GSCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>12.71%</td>
<td>8.96%</td>
<td>6.14%</td>
<td>7.27%</td>
<td>10.94%</td>
<td>7.70%</td>
<td>7.08%</td>
<td></td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>12.74%</td>
<td>11.93%</td>
<td>3.37%</td>
<td>8.95%</td>
<td>14.65%</td>
<td>3.91%</td>
<td>19.26%</td>
<td></td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.66</td>
<td>0.39</td>
<td>0.55</td>
<td>0.33</td>
<td>0.45</td>
<td>0.87</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>Minimum quarterly return</td>
<td>−14.19%</td>
<td>−10.16%</td>
<td>−5.33%</td>
<td>−18.55%</td>
<td>−17.28%</td>
<td>−2.87%</td>
<td>−17.73%</td>
<td></td>
</tr>
<tr>
<td>Correlation w/NAREIT</td>
<td>1.00</td>
<td>0.94</td>
<td>0.00</td>
<td>0.21</td>
<td>0.35</td>
<td>0.18</td>
<td>−0.04</td>
<td></td>
</tr>
<tr>
<td>Correlation w/NAREIT</td>
<td>0.94</td>
<td>1.00</td>
<td>0.00</td>
<td>0.24</td>
<td>0.00</td>
<td>0.14</td>
<td>−0.01</td>
<td></td>
</tr>
<tr>
<td>Correlation w/NCREIF</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.71</td>
<td>0.01</td>
<td>−0.18</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Correlation w/NCREIF</td>
<td>0.21</td>
<td>0.24</td>
<td>0.71</td>
<td>1.00</td>
<td>−0.01</td>
<td>−0.27</td>
<td>0.13</td>
<td></td>
</tr>
</tbody>
</table>

*Note:* Based on quarterly returns for stock, bond, commodity, and real estate indices; a quarterly risk-free rate based on the U.S. Treasury 30-day bill was used to compute Sharpe ratios.

deviation of REITs compared with the unsmoothed NCREIF Index. The NCREIF Index is most representative of the performance of private real estate funds because these funds are the major contributors of data to NCREIF.

The performance properties of direct and securitized real estate investment differ significantly. REITs exhibit a relatively high return (12.71 percent) and high standard deviation (12.74 percent), whereas appraisal-based real estate returns are low (6.14 percent) with low volatility (3.37 percent). The extremely low standard deviation of NCREIF Index returns is indicative of the volatility dampening associated with smoothing because of stale valuations. After the correction for smoothing, the NCREIF Index's volatility more than doubles to 8.95 percent. However, the average return increases from 6.14 percent for the NCREIF Index to 7.27 percent for the unsmoothed NCREIF Index. The correlation between these two indices is 0.71. The correlations between the unhedged NAREIT Index and the NCREIF Index and the unsmoothed NCREIF Index are both low (0.00 and 0.21, respectively), suggesting that securitized real estate investment is a poor substitute for direct investment.

The volatility of the hedged NAREIT Index, 11.93 percent, is higher than that of the NCREIF Index unsmoothed, 8.95 percent. This suggests the presence of a residual equity component in the hedged NAREIT Index that could be related to small-cap stocks, be simply unique to REITs, or be both. Even though the hedging correction is imperfect, the hedged NAREIT Index is a more realistic representation of the underlying real estate market, with a higher correlation with the unsmoothed NCREIF Index (0.24) than without the correction.

3.2.3. Interpretation Issues
When NAREIT and NCREIF indices are used as benchmarks for real estate investments or in asset allocation studies, the problems associated with the construction of the indices mentioned previously must be taken into account.21 Importantly for performance appraisal, the NCREIF Index is not an investable index.

3.3. Real Estate: Investment Characteristics and Roles
Real estate accounts for a major portion of many individuals' wealth. For example, equity in the residential property represented close to 30 percent of the net worth in the United Kingdom in 1999.22 For all homeowners in the United States, home equity represented 43 percent of their net worth in 2001 and is expected to be much greater today because real estate values have risen substantially since then.23 Because of the role of residential real estate for individuals as the place in which they live, however, most advisers to private clients do not include the clients' residences as "marketable" in the sense of assets that the adviser includes in a strategic asset allocation.

3.3.1. Investment Characteristics
In contrast to such alternative investments as hedge funds, which are essentially investment strategies and are similar to direct investment in commodities, real estate is an asset in itself, with some intrinsic value based on the benefits it may supply to individuals or businesses. Furthermore, investment in commercial real estate properties includes a substantial income component through rental income, which increases the stability of its returns.

A variety of investment characteristics affect the returns to real estate. The physical real estate market is characterized by relative lack of liquidity, large lot sizes, relatively high

---

21 For details see Geltner (2000) and Geltner and Ling (2001).
transaction costs, heterogeneity, immobility (with the asset fixed at a location), and relatively low information transparency (so the seller often knows more than the buyer). Physical real estate has rarely been traded on a centralized exchange. These characteristics can create the market opportunity for relatively high risk-adjusted returns for investors who can obtain cost-efficient, high-quality information.

The lack of reliable, high-frequency transaction data for properties necessitates the use of appraisal-based valuations. Later, we will discuss the checkpoints that a quantitative analysis of the returns to real estate must cover when evaluating real estate return data resulting from the use of appraisals.

Various market and economic factors affect real estate. For instance, interest rates directly or indirectly affect a multitude of factors associated with the demand and supply for real estate, such as business financing costs, employment levels, savings habits, and the demand and supply for mortgage financing. Worldwide, the returns to real estate are positively correlated with changes in gross national product. Population growth is, in the long term, a positive factor for real estate returns, but the real estate investor needs to research the demographics affecting the particular investment (such as migration into or out of the area and changes in the wealth profile of the locality).

Investigators have come to mixed conclusions on the inflation-hedging capabilities of real estate investment. Bond and Seiler (1998) found that U.S. residential real estate provided a significant inflation hedge in the 1969–94 period. Hoesli et al. (1997) found that U.K. real estate provided a better short-term inflation hedge than bonds but a worse hedge than stocks. Stevenson and Murray (1999) did not find evidence that Irish real estate provided a significant inflation hedge. Liu et al. (1997) found that real estate provided a worse hedge than stocks in some countries but a comparable hedge in others. Analyzing U.S. REITs specifically, Chatrath and Liang (1998) found some long-run but no short-run inflation-hedging ability.

Real estate values are affected by idiosyncratic variables, such as location. There appear to be strong continent-specific factors in real estate returns for Europe and North America. The implication is that complete diversification in real estate can be achieved only by investing internationally. Nearly optimal diversification can be achieved by targeting one country from each continent.

The following is a list of the general advantages and disadvantages of direct equity real estate investing. Most of the advantages and disadvantages apply to both individual and institutional investors.

**Advantages**

- To the extent that the law allows mortgage interest, property taxes, and other expenses to be tax deductible, taxable owners of real estate may benefit from tax subsidies.
- Mortgage loans permit most real estate borrowers to use more financial leverage than is available in most securities investing.
- Real estate investors have direct control over their property and may take action, such as expanding or modernizing, to increase the market value of the property. In contrast, an investor who owns a small position in the equity of a publicly traded company has virtually no voice in the management of the company.

---

25 See Eichholtz et al. (1998) and Eichholtz et al. (1999).
26 In part, this list reflects Francis and Ibbotson (2001).
Geographical diversification can be effective in reducing exposure to catastrophic risks (e.g., the risk of hurricanes or floods). The values of real estate investments in different locations can have low correlations; substantial geographical distance is often not necessary to achieve risk-reduction benefits.

Real estate returns, on average, have relatively low volatility in comparison with returns to public equities—even after correcting for the downward bias that results from the smoothing process associated with real estate appraisals. We discuss this bias later.

**Disadvantages**

- Most parcels of real estate are not easy to divide into smaller pieces. As a result, when such properties are a relatively large part of an investor’s total portfolio, real estate investing may involve large idiosyncratic risks for investors. Owners of single-family residences and large institutional investors that buy shopping centers may both experience this problem.
- The cost of acquiring information is high because each piece of real estate is unique.
- Real estate brokers charge high commissions relative to securities transaction fees.
- Real estate involves substantial operating and maintenance costs (e.g., for administration, leasing, repairs, and replacements) and hands-on management expertise, which are expenses or requirements not incurred by securities investors.
- Real estate investors are exposed to the risk of neighborhood deterioration, and the conditions that may lead to that are beyond the investor’s control.
- Any income tax deductions that a taxable investor in real estate may benefit from are subject to political risk—they may be discontinued.

3.3.2. Roles in the Portfolio

According to the 2005–2006 Russell Survey on Alternative Investing, strategic allocations to real estate average 3.4 percent of total assets in Japan, 6.7 percent in North America, 9.8 percent in Europe, and 10.4 percent in Australia. This survey forecasted increased allocations to real estate in all these countries except Australia. Almost two-thirds of European capital and about half of North American and Australian capital is reportedly committed to direct investment in land and buildings.27 Japan has much less capital committed to direct investment in real estate. The survey also indicates a strong home bias is revealed in real estate investments. The range of allocations is broadly consistent with what a quantitative approach to asset allocation would suggest.28

Because real estate may follow many economic fundamentals, real estate markets follow economic cycles. From a tactical asset allocation point of view, good forecasting of economic cycles should thus result in improved dynamic strategies for reallocating among different assets on the basis of expected stages of their respective cycles. Among the variables to focus on as systematic determinants of real estate returns are growth in consumption, real interest rates, the term structure of interest rates, and unexpected inflation.29

3.3.2.1. The Role of Real Estate as a Diversifier

In addition to its potential to add value through active management, real estate has historically been viewed as an important diversifier. Real estate as an asset class typically responds differently from the way either stocks or bonds

---

27The survey points out that these data may be biased by the kind of respondents—namely, the larger institutions, which tend to use direct investments.
28For example, Kallberg and Liu (1996), using a mean–variance-optimization framework, found that a 9 percent allocation to real estate is optimal in a portfolio that includes stocks, bonds, and cash.
29See Ling and Naranjo (1997).
do. The reason is that, in the past, directly owned real estate was not highly correlated with the performance of other assets. For example, it was a good risk diversifier in the traditional stock and bond portfolio. Also, historically, real estate investment has experienced lower volatility than other asset classes because it is typically less affected by short-term economic conditions. Income-producing commercial real estate can be a relatively stable investment with income derived from tenants’ lease payments. Thus, real estate can also be a good income enhancer.30

To illustrate the potential diversification benefit of real estate investments in a portfolio context, Exhibit 8-4 presents performance results using an approach that is also used in subsequent parts of this chapter and elsewhere.31 The exhibit shows statistics for a 50 percent/50 percent U.S. stock/U.S. bond portfolio (Portfolio I), which is a simple baseline portfolio. Then the allocations to U.S. stocks and bonds are each reduced by 10 percentage points and reassigned in various ways to other asset classes; the resulting portfolios include a portfolio containing the alternative investment under discussion, in this case real estate. This method of presentation provides information on the effect of holding the alternative investment under discussion in conjunction with various other asset classes that the investor might hold. A particular investor may have a different baseline portfolio, but the investor can adapt the approach shown here to his or her needs. In Section 2, we supplied the additional cautions the reader should be aware of in evaluating an analysis based on a given historical sample. In real estate, data series extend much further back than 1990, which we have selected for the reasons of comparability discussed in Section 2.

Comparing Portfolio III (REITs, U.S. equities, and U.S. bonds) with Portfolio I (only U.S. equities and U.S. bonds), one can see that the addition of REITs increases the Sharpe ratio from 0.67 to 0.79. The reason for this improvement is the high Sharpe ratio of REIT returns in the sample period coupled with their moderate correlation with S&P 500 Index returns (0.35, Exhibit 8-3). When REITs are added to a more diversified portfolio made up of assets included in Portfolio II to produce Portfolio IV, different results are observed: The Sharpe ratio is actually the same for Portfolios II and IV.

Overall, for the sample period, REITs provided some diversification benefits relative to a stock/bond portfolio, but it was relatively less effective in that role than hedge funds and commodities and did not have diversification benefits in a stock/bond portfolio to which hedge fund and commodity exposures had been added.

Direct investment in real estate as represented by unsmoothed NCREIF returns, however, provided more diversification benefit. Adding the unsmoothed NCREIF Index (20 percent) to a portfolio of stocks and bonds raised the Sharpe ratio of the portfolio from 0.67 (Portfolio I) to 0.77 (Portfolio V). This result would be expected because of the small negative correlation between unsmoothed NCREIF Index returns and the S&P 500 returns (−0.01, Exhibit 8-3) and the negative correlation between unsmoothed NCREIF Index returns and Lehman Aggregate returns (−0.27, Exhibit 8-3). As the results for Portfolio VI show, adding the unsmoothed NCREIF Index to a portfolio including hedge funds and commodities results in a slightly larger Sharpe ratio than that of Portfolio II, although adding NAREIT to such a portfolio results in the same Sharpe ratio as Portfolio II. These results may indicate that real estate is an \textit{ex post} redundant asset in the presence of hedge funds and commodities.

30See Downs et al. (2003).
31See Schneeweis and Spurgin (1997a) and Ankrin and Hensel (1993). The Hedge Fund Composite Index (HFCI) is created by CISDM of the University of Massachusetts as follows: Between 1990 and 1993, it is an equally weighted portfolio of EACM 100 and HFR; since 1994, it has been an equally weighted portfolio of EACM 100, HFR, and Credit Suisse/Tremont.
### EXHIBIT 8-4  Real Estate Performance in Portfolios, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>Portfolio I</th>
<th>Portfolio II</th>
<th>Portfolio III</th>
<th>Portfolio IV</th>
<th>Portfolio V</th>
<th>Portfolio VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>9.60%</td>
<td>9.95%</td>
<td>10.34%</td>
<td>10.16%</td>
<td>9.33%</td>
<td>9.72%</td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>7.87%</td>
<td>6.81%</td>
<td>7.62%</td>
<td>7.05%</td>
<td>6.59%</td>
<td>6.43%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.67</td>
<td>0.83</td>
<td>0.79</td>
<td>0.83</td>
<td>0.77</td>
<td>0.85</td>
</tr>
<tr>
<td>Minimum quarterly return</td>
<td>−6.45%</td>
<td>−5.18%</td>
<td>−7.99%</td>
<td>−5.47%</td>
<td>−5.35%</td>
<td>−4.67%</td>
</tr>
<tr>
<td>Correlation w/NAREIT Index</td>
<td>0.37</td>
<td>0.36</td>
<td>0.64</td>
<td>0.52</td>
<td>0.51</td>
<td>0.50</td>
</tr>
<tr>
<td>Correlation w/NAREIT Index hedged</td>
<td>0.03</td>
<td>0.04</td>
<td>0.34</td>
<td>0.20</td>
<td>0.21</td>
<td>0.20</td>
</tr>
<tr>
<td>Correlation w/NCREIF Index</td>
<td>−0.03</td>
<td>−0.03</td>
<td>−0.03</td>
<td>−0.03</td>
<td>0.16</td>
<td>0.06</td>
</tr>
<tr>
<td>Correlation w/NCREIF Index unsmoothed</td>
<td>−0.08</td>
<td>−0.04</td>
<td>0.01</td>
<td>−0.01</td>
<td>0.19</td>
<td>0.08</td>
</tr>
</tbody>
</table>

**Notes:** In the following listing, HFCI is the Hedge Funds Composite Index published by CISDM (Center for International Securities and Derivatives Markets) of the University of Massachusetts. It is created as follows: For the period between 1990 and 1993, it is an equally weighted portfolio of the EACM 100 and Hedge Fund Research (HFR) indices; since 1994, it has been an equally weighted portfolio of EACM 100, HFR, and Credit Suisse/Tremont hedge fund indices.

- **Portfolio I:** 50 percent S&P 500 and 50 percent Lehman Aggregate Bond Index.
- **Portfolio II:** 40 percent S&P 500, 40 percent Lehman Aggregate, 10 percent HFCI, and 10 percent GSCI.
- **Portfolio III:** 40 percent S&P 500, 40 percent Lehman Aggregate, and 20 percent NAREIT.
- **Portfolio IV:** 40 percent S&P 500, 40 percent Lehman Aggregate, 5 percent HFCI, 5 percent GSCI, and 10 percent NAREIT.
- **Portfolio V:** 40 percent S&P 500, 40 percent Lehman Aggregate, and 20 percent NCREIF unsmoothed.
- **Portfolio VI:** 40 percent S&P 500, 40 percent Lehman Aggregate, 5 percent HFCI, 5 percent GSCI, and 10 percent NCREIF unsmoothed.

**Source:** CISDM (2005a).
EXHIBIT 8-5  Unsmoothed Performance of Direct Real Estate Indices, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>NCREIF Unsmoothed</th>
<th>Apartment</th>
<th>Industrial</th>
<th>Office</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>7.27%</td>
<td>9.39%</td>
<td>7.85%</td>
<td>4.59%</td>
<td>8.17%</td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>8.95%</td>
<td>5.76%</td>
<td>10.68%</td>
<td>10.63%</td>
<td>9.65%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.33</td>
<td>0.89</td>
<td>0.33</td>
<td>0.03</td>
<td>0.40</td>
</tr>
<tr>
<td>Minimum quarterly return</td>
<td>−18.55%</td>
<td>−10.45%</td>
<td>−16.15%</td>
<td>−20.91%</td>
<td>−14.25%</td>
</tr>
</tbody>
</table>

Source: CISDM (2005a).

These results are consistent with evidence indicating that direct real estate investment may provide some diversification benefits to stocks and bonds but benefits may disappear when hedge funds and commodities are added to the portfolio.

3.3.2.2. Diversification within Real Estate Itself  Investors also seek diversification by type and geography within real estate investing. Investments in different real estate sectors differ in regard to risk and return. The property types that have higher levels of embedded risk, such as large office assets, have generated lower risk-adjusted returns than other sectors and are likely to have more pronounced market cycles. Conversely, those sectors that offer higher risk-adjusted returns, such as apartments, appear to be less volatile and offer more defensive characteristics. As Exhibit 8-5 shows, apartments offered the highest risk-adjusted returns, and office assets showed low returns (4.59 percent) and high volatility (10.63 percent) in the 1990–2004 period. This suggests that targeting the apartment sector of the commercial real estate market over the last decade would have yielded better results than simply diversifying across all sectors. The higher returns of apartment real estate can be partially explained by a low correlation with inflation. In addition, to the degree that inflation results in a slowdown in the real economy, the apartment sector would be negatively correlated with inflation. Thus, the office, retail, and industrial sectors, whose returns seem to include an inflation component, have been at a relative disadvantage in the 1990s.

Overall, direct real estate investment may be able to provide an inflation hedge to some degree.

Exhibit 8-6 shows the correlation matrix of total returns for the four geographical NCREIF (unsmoothed) indices and the combined index. The correlations are high for all pairs of geographical subindices. This suggests that successful geographical diversification should take into account finer subdivisions, such as metropolitan areas or cities.

The properties of real estate return distributions are important for the portfolio manager because they provide key inputs into the asset allocation process. Many return observations in indices of direct investment tend to be close to zero as a result of the illiquid market. Equity real estate returns generally have been found not to follow a normal distribution, in U.S. markets and elsewhere, for both the direct investments and indirect investments. Furthermore, the

33 See also results in Section 4 (Commodity Investment), which are consistent with Froot (1995).
34 See Young and Graff (1995), Miles and McCue (1984), and Hartzell, Hekman, and Miles (1986).
direct market exhibits a high degree of persistence in returns (positive following positive and negative following negative), whereas the indirect market does not show such persistence. The explanation for these facts is a matter of continuing investigation.36

3.3.2.3. Investment in Real Estate Worldwide  The benefit of real estate investment internationally has been researched. Overall, the evidence indicates that investors may benefit from including domestic and nondomestic investments in real estate in their portfolios.

Real estate has been found to be an effective portfolio diversifier for seven countries (Australia, France, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States) on three continents, based on data from 1987–2001, and including both domestic and international real estate assets increases the benefits.37 Case, Goetzmann, and Wachter (1997) concluded that international real estate diversification would have been beneficial to a U.S. investor. The correlation between property share (real estate company) returns and other common stock returns appears to have declined in both the United States and the United Kingdom, indicating the possibility of increased diversification potential for property shares.38 Research has also suggested that U.S. REITs may be an attractive addition to domestic stocks and bonds for investors from Canada and the United Kingdom.39 Example 8-4 shows the application of some of the facts and methods discussed in the text.

### Example 8-4  Adding Real Estate to the Strategic Asset Allocation

As CIO of The Annette Hansen Charitable Foundation (TAHCF), a U.S.-based foundation supporting medical research, Maryann Dunn will present to the trustees a recommendation that they revise the foundation’s strategic asset allocation to include direct investment in real estate.

---

38See Brounen and Eichholtz (2003).
39See Mull and Soenen (1997), who studied the 1985 to 1994 period.
The Foundation’s current portfolio and strategic asset allocation is allocated 50 percent common stocks/50 percent bonds. Twelve percent of the common stock allocation (six percent of the total portfolio) is invested in REITs.

- The risk-free rate of interest is 3.5 percent.
- The forecasted inflation rate is 3 percent.
- TAHCF’s overall investment objective is to preserve the real (inflation-adjusted) value of assets after spending. Its spending rate is 5 percent of 12-month average asset value.
- TAHCF’s cost of earning investment returns is 20 basis points per year.
- Exhibit 8-7 shows Dunn’s expectations for the current and proposed asset allocations. Dunn’s expectations for direct investment are based on unsmoothed NCREIF historical data adjusted for her current economic outlook.

EXHIBIT 8-7  Forecast Data

<table>
<thead>
<tr>
<th>Measure</th>
<th>50/50 Stocks/Bonds</th>
<th>45/45/10 Stocks/Bonds/U.S. Direct Real Estate Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected return</td>
<td>5.5%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Std. dev. of return</td>
<td>11.8%</td>
<td>10.8%</td>
</tr>
</tbody>
</table>

Dunn expects opposition to her proposal to come from a trustee, Bob Enicar. Enicar has stated at a prior board meeting: “TAHCF’s allocation to equity includes substantial investment in REITs. REITs typically provide risk diversification comparable to that of direct equity investments for a balanced portfolio of stocks and bonds while offering substantially more liquidity.”

1. State and explain two financial justifications that Hansen could present for revising TAHCF’s asset allocation to 45/45/10 stocks/bonds/U.S. direct real estate investment.
2. State and explain one disadvantage of the proposed revised strategic asset allocation.
3. Contrast unsmoothed and smoothed NCREIF indices and justify Hansen’s choice of the unsmoothed NCREIF Index in formulating expectations for direct real estate investment.
4. Draft a response to Enicar’s critique.

Solution to Problem 1: The financial justifications for adding direct real estate investment to the strategic asset allocation include the following:

- The Sharpe ratio of the 45/45/10 stock/bonds/U.S. direct real estate investment portfolio at \((5.9\% - 3.5\%)/10.8 = 0.222\) is greater than that of the current 50/50 stocks/bonds allocation at \((5.5\% - 3.5\%)/11.8 = 0.169\).
- Direct real estate investment’s inflation-hedging qualities are consonant with TAHCF’s stated concern for preserving the real purchasing power of funds.
- The revised strategic asset allocation is expected to come closer to satisfying TAHCF’s investment objective than does the existing strategic asset allocation.
Solution to Problem 2: The proposed strategic asset allocation’s expected return of 5.9 percent falls well short of the \((1.05)(1.03)(1.0020) - 1.0 = 8.37\%\) return objective implicit in the description of the problem.

Solution to Problem 3: The NCREIF Index is based on property appraisals rather than market values. Appraised values tend to be less volatile than market values, an effect known as smoothing. As a result of smoothing, volatility and correlations with other assets will tend to be understated, which means an overstatement of the benefits of real estate in the portfolio. Using the unsmoothed NCREIF index gives a more accurate picture of the benefits of real estate investment.

Solution to Problem 4: Enicar is correct that securitized real estate is more liquid than direct real estate investment. However, direct real estate’s correlations with U.S. equities and U.S. bonds are lower than REITs’ correlations, making direct real estate a stronger diversifier when added to a portfolio of stocks and bonds.

In Example 8-4, a strategic asset allocation involving direct real estate investment was reviewed that, in expectation, did not promise to fulfill the investor’s return requirement. Section 4 discusses an alternative asset class that has become a popular vehicle for investors seeking high returns.

3.3.3. Other Issues Due diligence in active direct real estate investment should cover the checkpoints outlined in Example 8-2: market opportunity, investment process, organization, people, terms and structure, service providers, documents, and write-up. Within each of these headings, some checkpoints will involve investment-specific points, such as valuation methods, financing, real estate legal issues (e.g., zoning, a title check), and for taxable investors especially, tax issues.

In the next section, we discuss another major type of alternative investment, private equity.

4. PRIVATE EQUITY/VENTURE CAPITAL

Private equity is an ownership interest in a private (non-publicly-traded) company. The term private equity refers to any security by which equity capital is raised via a private placement rather than through a public offering. As private placements, private equity securities are not registered with a regulatory body. To qualify as private placements, securities are generally offered for sale to either institutions or high-net-worth individuals (accredited investors). Private equity investments can be made face to face with the company needing financing or indirectly through private equity funds.

A variety of investment activities can take place in the investment structures known as private equity funds—the pooled investment vehicles through which many investors make (indirect) investments in generally highly illiquid assets. These investment activities range from financing private businesses, to leveraged buyouts of public companies, to distressed debt investing, to the public financing of public infrastructure projects. Thus, a host of investing activities requiring distinct expertise is often gathered under the rubric of private equity. In this
section, the focus is on the two historically most important fields of private equity activity: the equity financing of new or growing private companies, an activity often called venture capital, and the buyout of established companies via private equity funds known as buyout funds.40 In venture capital, a company that starts out as private may eventually become publicly owned. The converse process—taking a publicly owned company private in a buyout of publicly held interests and the private purchase of a division of a public corporation, as well as buyouts of established private companies—constitutes the chief sphere of activity of buyout funds.

EXAMPLE 8-5 Private Investment in Public Entity (PIPE)

The range of activities conducted via the structure of a private equity fund evolves and grows. An example is the PIPE—private investment in public entity. If the share price of a publicly traded company has dropped significantly from its value at the time of going public, the company may seek new sources of capital via a PIPE. Through a PIPE, an investor makes a relatively large investment in a company, usually at a price less than the current market value.

On January 16, 2004, Novatel Wireless, Inc., a publicly traded company, sold 1,142,855 shares of newly issued common stock to a group of private investment firms (a PIPE). The shares included warrants entitling the investors to purchase an additional 228,565 shares at a price of US$8.833 per share. Novatel raised net capital of US$7,525,000 in the initial transaction. On February 13, 2004, Novatel filed a registration statement with the U.S. SEC that would entitle these private investors to sell their shares on the open market. At the time of the original transaction, Novatel’s shares were trading for US$9. At the time the registration statement was filed, the shares were trading for US$16.48.


Private equity represents an important asset class that has received increasing interest from pension plans, endowments, foundations, and corporations, and from family offices and other advisers to the private wealth market. In some countries, such as the United Kingdom, exposure to this investment type is also available through exchange-traded vehicles.

In a number of countries, including the United States, private equity is one type of alternative investment that practitioners often point to as facing serious capacity issues. The high failure rate of young businesses is an indication that the combination of winning ideas for products/services and the entrepreneurial and/or managerial skill, experience, and commitment to realize them is in limited supply at any given point in time. The venture or business that

---

40”Venture capital” is widely used to refer to early-stage financing of companies. Yet, practitioners also talk of late-stage venture capital, referring to the portion prior to exiting from the investment. According to Lerner (2000), p. 522, outside the United States, the term “venture capital” is often used as a synonym for “private equity.” Confusingly, practitioners sometimes use “private equity” to refer to investment buyout funds rather than venture capital funds. In short, terminology varies, but the reader can understand the meaning from the context.
EXHIBIT 8-8  Investment Processes of (Direct) Private Equity Investment and Investment in Publicly Traded Equities

<table>
<thead>
<tr>
<th>Private Equity Investments</th>
<th>Publicly Traded Securities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure and Valuation</strong></td>
<td></td>
</tr>
<tr>
<td>Deal structure and price are negotiated between the investor</td>
<td>Price is set in the context of the market. Deal structure is</td>
</tr>
<tr>
<td>and company management.</td>
<td>standardized. Variations typically required approval from</td>
</tr>
<tr>
<td></td>
<td>securities regulators.</td>
</tr>
<tr>
<td><strong>Access to Information for Investment Selection</strong></td>
<td></td>
</tr>
<tr>
<td>Investor can request access to all information, including</td>
<td>Analysts can use only publicly available information to assess</td>
</tr>
<tr>
<td>internal projections.</td>
<td>investment potential.</td>
</tr>
<tr>
<td><strong>Postinvestment Activity</strong></td>
<td></td>
</tr>
<tr>
<td>Investors typically remain heavily involved in the company</td>
<td>Investors typically do not sit on corporate boards or make</td>
</tr>
<tr>
<td>after the transaction by participating at the board level and</td>
<td>ongoing assessments based on publicly available information and</td>
</tr>
<tr>
<td>through regular contact with management.</td>
<td>have limited access to management.</td>
</tr>
</tbody>
</table>

*Source: Prepared by Andrew Abouchar, CFA, of Tech Capital Partners.*

is in a position of strength with respect to those qualities will be scrutinizing the potential investor for qualities needed in a partner/collaborator as closely as the investor will go over the investment checkpoints.

Most professional investors have wide experience and knowledge of public equity markets. Although public and private equity investments have common elements, private equity investment involves distinct knowledge and experience. The contrast is greatest in the case of direct private equity investment, which often calls on the investor’s skills as a businessperson, as Exhibit 8-8 shows.

The following section discusses some prominent characteristics of the private equity marketplace and private equity funds.

### 4.1. The Private Equity Market

The first question to address is why the market opportunities for private equity arise. Take the case of venture capital investment first: A closely held business is characterized by a small number of owners and is not publicly traded. Often, the owners of a closely held business are family members, but closely held businesses can also have unrelated owners. Such businesses may seek outside investors for a variety of reasons. For example, the original owners may not have adequate capital for growth or even to fund current operations. Entrepreneurs frequently lack the professional managerial skills and experience to manage the enterprise they started after it reaches a certain size. Venture capital firms may be able to supply valuable assistance in the transition to professional management. The original owners may also want to diversify their wealth. For an individual investor, a closely held business can represent a significant portion of his or her overall wealth. The liquidity afforded by markets for publicly traded shares allows such investors to diversify their portfolios at lower costs. Venture capitalists also

---

41 As discussed in more detail shortly, venture capital firms represent dedicated pools of capital providing equity or equity-linked financing to privately held companies.
can assist in the initial public offering (IPO) of shares, which permits the original owners to eventually realize public market valuations for their holdings.42

Formative-stage companies usually raise money through marketing an effective business plan to potentially interested parties. The business plan describes the intended products and/or services, the market that will be served, the business strategy, the dates of expected financial milestones (such as profitability to be achieved), the expected cash “burn rate,” the additional rounds of financing that the company expects to need, and other relevant information.

In the case of funds raised through an agent, a document called a private placement memorandum may be used. This document should discuss a myriad of factors affecting the company. It should describe the company’s business and competitive factors and discuss how it intends to use the proceeds from the offering. It should also contain financial statements and projections, although not necessarily audited financial statements.

4.1.1. The Demand for Venture Capital

Issuers of venture capital include the following:

• **Formative-stage companies.** This group ranges from newly formed companies, to young companies beginning product development (“start-ups”), to companies that are just beginning to sell a product. Worldwide, probably more than a million new businesses are formed every year, but venture capitalists frequently are not interested in companies at that earliest stage. In the United States, venture capitalists that do invest in formative-stage companies might be looking for companies with, for example, projected revenues in the US$10 million to US$50 million range within a five-year horizon.43

• **Expansion-stage companies.** This group ranges from young companies that need financing for expanding sales, to established companies with significant revenues (middle-market companies), to companies that are preparing for an IPO of stock.

The financing stages through which many private companies pass include the following:44

*Early-stage financing:*

• **Seed**—generally, seed money is a relatively small amount of money provided to the entrepreneur to form a company and prove that an idea has a reasonable chance of commercial success.

• **Start-up**—at this stage, the company has been formed and an idea has been proven but the company needs money to bring the product or idea to commercialization. This is a pre-revenue stage.

• **First stage**—if the company has exhausted its seed and start-up financing, the company may seek additional funds. Obviously, the company must have made progress from earlier stages to warrant an investment at this stage.

*Later-stage financing:* This is the financing of promising companies that need funds for expanding sales.

42 An initial public offering is the initial issuance of common stock registered for public trading by a formerly private corporation.

43 This comment supplies an idea of the stage at which venture capitalists become active; the numbers can be expected to change over time and may be different elsewhere.

44 There is some variation in terminology. For example, after the seed and start-up stages, some practitioners distinguish Series A from Series B in reference to the series of preferred shares being issued in the transaction.
### EXHIBIT 8-9  Venture Capital Timeline

<table>
<thead>
<tr>
<th></th>
<th>Formative-Stage Companies</th>
<th>Expansion-Stage Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seed</td>
<td>Early Stage</td>
</tr>
<tr>
<td>Stage characteristics</td>
<td>Idea incorporation, first personnel hired, prototype development</td>
<td>Moving into operation, initial revenues</td>
</tr>
<tr>
<td>Stage financing (buyers of private equity)</td>
<td>Founders, FF&amp;F, angels, venture capital</td>
<td>Angels, venture capital</td>
</tr>
<tr>
<td>Purpose of financing</td>
<td>Supports market research and establishment of business</td>
<td>Start-up financing supports product development and initial marketing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>First-stage financing supports such activities as initial manufacturing and sales</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*FF&F = founder’s friends and family. The sources of financing are listed in typical order of importance.*
4.1.2. The Exit  Because private equity is by definition not publicly traded, the exit (the liquidation or divestment of a private equity investment) is often difficult and is a major item of strategy. The investor can realize the value of the holding in several ways:

- Merger with another company.
- Acquisition by another company (including a private equity fund specializing in this).
- An IPO by which the company becomes publicly traded.

Of course, it is also possible that the venture will not succeed and the business will be closed without any recovery of the original investment by the equityholder. Exhibit 8-9 summarizes the venture capital timeline.

4.1.3. The Supply of Venture Capital  Suppliers of venture capital include the following:

- **Angel investors.** An angel investor is an accredited individual investing chiefly in seed and early-stage companies, sometimes after the resources of the founder’s friends and family have been exhausted. Angel investors are often the first outside investors in a company, even before a company is organized or there is a real product. The size of the investments made by angels is relatively small. However, because they are generally invested at the earliest point, such investments are among the riskiest.

- **Venture capital.** Venture capital (VC) refers broadly to the pools of capital managed by specialists known as venture capitalists who seek to identify companies that have great business opportunities but need financial, managerial, and strategic support. Venture capitalists invest alongside company managers; they often take representation on the board of directors of the company and provide significant expertise in addition to capital. An individual pool is a venture capital fund (VC fund). An industry of investment firms sponsors series of such funds and sometimes a variety of similarly structured vehicles taking advantage of different opportunities. These firms may be private partnerships, closely held corporations, or sometimes, publicly traded corporations. In the United Kingdom, venture capital trusts (VCTs), which are exchange-traded, closed-end vehicles, provide an example of other opportunities that are available.

- **Large companies.** A variety of major companies invest their own money via corporate private equity in promising young companies in the same or a related industry. The activity is known as corporate venturing, and the investors are often referred to as “strategic partners.” Corporate venturing funds are not available to the public.

---

**EXAMPLE 8-6  The IPO of Google**

The IPO of Google, Inc., illustrates the timeline for private equity. Google was incorporated in 1998 with an initial investment of US$1 million by family, friends, and angel investors. In early 1999, Google received US$25 million in venture capital funds. The two venture capital firms that provided capital in 1999 each own about 10.2 percent of the company. In April 2004, Google filed for an IPO. The IPO date was August 19, 2004, with Morgan Stanley and Credit Suisse First Boston as the lead underwriters in an
Most investors participate in private equity through private equity funds. Among these funds, buyout funds constitute a larger segment than VC funds, as measured by assets under management or the size of capital commitments. The capital commitments to buyout funds in many years have been two to three times the size of those to VC funds.

Buyout funds may be separated into two major groups, mega-cap buyout funds and middle-market buyout funds. **Mega-cap buy-out funds** take public companies private. **Middle-market buy-out funds** purchase private companies whose revenues and profits are too small to access capital from the public equity markets. Middle-market buyout funds typically purchase established businesses, such as small privately held companies (including those that may have received venture capital support) and divisions spun off from larger companies. The buyout fund manager seeks to add value by:

- Restructuring operations and improving management.
- Opportunistically identifying and executing the purchase of companies at a discount to intrinsic value.
- Capturing any gains from the addition of debt or restructuring of existing debt.

To further their ability to add value through restructuring operations and improving management, large buyout organizations maintain a pool of experienced operating and financial executives who can be inserted into the companies if necessary or appropriate. These organizations look to cut costs and increase revenues. As the owner/managers of companies, buyout organizations have well-developed processes for installing incentive compensation systems and management reporting systems. They have experience restructuring supply chains.
and distribution channels. Buyout firms may explain the market opportunity as the potential to add value by substitution of a highly focused private governance model, in which expert owners have complete control, for a public governance model with dispersed ownership, conflicts of interest, and high regulatory compliance costs.

Buyout funds can realize value gains through a sale of the acquired company, an IPO, or a dividend recapitalization. A dividend recapitalization involves the issuance of debt to finance a special dividend to owners (sometimes refinancing existing debt in the process). Dividend recapitalizations have at times allowed buyout funds to recoup all or most of the cash used to acquire a company within two to four years of the buyout while still retaining ownership and control of the company. However, dividend recapitalization has the potential to weaken the company as a going concern by overleveraging it.

The major investors in private equity funds are public pension funds, corporate defined-benefit pension plans, endowments, foundations, and family offices. In the United States, public pension plans are currently the most important players as measured by the amount of dollars committed; they are followed by the other investors in the order listed. Endowments and foundations have among the largest allocations in their policy portfolios. Family offices are a growing influence.45

4.1.4. Types of Private Equity Investment Both direct and indirect investors in private equity need to understand the basics of direct private equity investment in order to have an informed grasp of its return and risk characteristics.

Direct venture capital investment is structured as convertible preferred stock rather than common stock. The terms of the preferred stock require that the corporation pay cash equal to some multiple (e.g., 2 ×) of preferred shareholders’ original investment before any cash can be paid on the common stock, which is the equity investment of the founders. Preferred stock is senior to common stock also in its claims on liquidation value. This financing structure mitigates the risk that the company will take on the venture capital investment and distribute it to the owners/founders. It also provides an incentive to the company to meet the return goals of the outside investors.

Investors in subsequent rounds usually have rights to cash flows that are senior to preferred stock issued in previous financing rounds. All else being equal, therefore, shares issued in later rounds are more valuable than shares issued in earlier rounds, which in turn, are more valuable than the founders’ common shares. Nevertheless, the differences in value may be slight and are frequently ignored in valuation. For convertible preferred shares issued in any round, an event such as a buyout or an acquisition of the common equity at a favorable price will trigger conversion of the preferred into the common shares of the company.

Indirect investment is primarily through private equity funds, including VC funds and buyout funds. Private equity funds are usually structured as limited partnerships or limited liability companies (LLCs) with an expected life of 7 to 10 years with an option to extend the life for another 1 to 5 years.46 The fund manager’s objective is to realize the value of all portfolio investments by the fund’s liquidation date. There is typically an offering period in which capital commitments are solicited.

The limited partnership and LLC forms are attractive because income and capital gains flow through to the limited partners (for the LLC, the shareholders) for tax purposes, thus avoiding the possible double taxation that can occur in the corporate form. The limited

45See Boyer (2005).
partners or shareholders do not bear any liability beyond the amount of their investments. The limited partners or shareholders commit to a specific investment amount that the general partner (in an LLC, the managing director) “takes down” over time in a series of capital calls to make specific investments or to pay expenses; private equity funds usually do not maintain a pool of uninvested capital. The general partner (or the managing director) is the venture capitalist, the party selecting and advising investments. The general partner, who may be an individual or another entity (such as a corporation or partnership), also commits its own capital. In this way, the interests of the outside investors and the fund manager/general partner/managing director are closely aligned.

The LLC form, available in the United States and some other countries under different names and with different requirements, is a hybrid of the corporate and partnership forms. It provides investors with more influence on the fund’s operations than does a limited partnership interest—in particular, more control over the raising of additional committed capital. The LLC is often the preferred form when raising funds from a relatively small group of substantial and knowledgeable investors who may want to be proactive investors.

Private equity funds of funds are also available. Such funds invest in other private equity funds. Management fees of funds-of-funds vehicles range from 0.5 percent to 2 percent of the net assets managed; these fees are on top of fees charged by the underlying funds.

In contrast to the structure of private equity funds, in venture capital, the company receiving support is organized in a corporate form because one desirable exit is a successful initial offering of shares to the public. Examples of the corporate form include the U.K. public limited company (PLC), the corporation in the United States, the kabushiki kaisha (K.K.) in Japan, the sociedad anónima in Spain, the société anonyme in France, and the Gesellschaft mit beschränkter Haftung (GmbH) in Germany. The European Union has developed a new structure, the European company or societas Europeae (SE), that will permit companies in the EU to operate throughout the EU under one set of rules and with a uniform management system.

The compensation to the fund manager of a private equity fund consists of a management fee plus an incentive fee. The management fee is usually a percentage of limited partner commitments to the fund. (If the investor has made a capital commitment of US$50 million but actually invested only US$10 million, the investor generally pays a management fee on the US$50 million committed.) Management fees are often in the 1.5 to 2.5 percent range and often scale down in the later years of a partnership to reflect a lower work load.

The fund manager’s incentive fee, the carried interest, is the share of the private equity fund’s profits that the fund manager is due once the fund has returned the outside investors’ capital (which may be specified as the capital committed or the capital invested). Carried interest is usually expressed as a percentage of the total profits of the fund. A common value is 20 percent. In such a structure, the fund manager will thus receive 20 percent of the profits and distribute the remaining 80 percent of the profits to investors. In some funds, the carried interest is computed on only those profits that represent a return in excess of a hurdle rate (the hurdle rate is also known as the preferred return). A hurdle rate of 6 percent means that only the private equity fund’s profits in excess of an annualized return of 6 percent are subject to the 20 percent carried interest. Because early investments by the fund may achieve high rates of return but later investments do poorly, private equity funds sometimes have a claw-back provision that specifies that money from the fund manager be returned to investors if at the end of a fund’s life investors have not received back their capital contributions and contractual share of profits.

In distributing cash flows to investors and the fund manager, a private equity fund first distributes to investors their invested capital and preferred return (if any is specified). Sometimes, the fund manager is allowed to take a small percentage of early distributions.
Typically, following the period in which all or most distributions go to investors, there is a catch-up period in which the fund manager receives all or the major share of profits. After the fund manager has caught up to its specified share of profits according to the contract, subsequent profits are distributed according to the carried interest percentage—for example, 80 percent to investors and 20 percent to the fund manager. Some of the manager’s profits may be put in an escrow account to satisfy any claw-back liability.

The investor in a private equity fund expects to receive the benefits of the general manager’s ability to select worthy investments and maintain active involvement in the investments. The fund manager and the manager’s team should be able to shore up weaknesses in the companies’ management and assist in planning and executing a successful exit strategy that realizes the value of the investments.

4.1.5. Size of the Private Equity Market

A reliable estimate of direct private equity investment worldwide is hard to obtain, but as of early 2006, approximately US$200 billion was invested in private equity VC and buyout funds worldwide via approximately 1,000 private equity vehicles. In the United States, a quarterly study of venture capital activity is performed through a joint effort of PricewaterhouseCoopers, Thomson Venture Economics, and the National Venture Capital Association (NVCA). Exhibit 8-10 presents a summary of the annual results through 2004.

Pricewaterhousecoopers, Thomson Venture Economics, and the European Private Equity and Venture Capital Association collaborate on similar surveys of private equity activity across continental Europe and the United Kingdom. Exhibit 8-11 on page 508 summarizes recent investment activity of VC and buyout funds. As in the United States, 2000 marked a high point of activity.

4.2. Benchmarks and Historical Performance

As for many other alternative investment types, events that indicate the market value of a private equity investment generally occur infrequently. Typical market price–revealing events include the raising of new financing, the acquisition of the company by another company, the

---

**EXHIBIT 8-10 U.S. Venture Capital Activity: MoneyTree\textsuperscript{TM}Survey**

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment Amount (US$)</th>
<th>Number of Deals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>7,627,158,000</td>
<td>1,874</td>
</tr>
<tr>
<td>1996</td>
<td>11,521,998,000</td>
<td>2,612</td>
</tr>
<tr>
<td>1997</td>
<td>14,799,528,000</td>
<td>3,185</td>
</tr>
<tr>
<td>1998</td>
<td>21,258,792,000</td>
<td>3,695</td>
</tr>
<tr>
<td>1999</td>
<td>54,525,275,000</td>
<td>5,608</td>
</tr>
<tr>
<td>2000</td>
<td>105,859,076,000</td>
<td>8,082</td>
</tr>
<tr>
<td>2001</td>
<td>40,582,005,000</td>
<td>4,600</td>
</tr>
<tr>
<td>2002</td>
<td>21,409,439,000</td>
<td>3,035</td>
</tr>
<tr>
<td>2003</td>
<td>18,186,857,000</td>
<td>2,715</td>
</tr>
<tr>
<td>2004</td>
<td>21,341,540,000</td>
<td>2,910</td>
</tr>
</tbody>
</table>

IPO, or failure of the business. Infrequent market pricing poses a major challenge to index construction. How can returns be calculated without market transactions?

When measuring the performance of a private equity investment, investors typically calculate an internal rate of return based on cash flows since inception of the investment and the ending valuation of the investment (the net asset value or residual value). Similarly, major venture capital benchmarks, such as Thomson Venture Economics, provide IRR estimates for private equity funds that are based on fund cash flows and valuations.

4.2.1. Benchmarks

Major benchmarks for U.S. and European private equity are those provided by Cambridge Associates and Thomson Venture Economics, who present an overall private equity index representing two major segments: VC funds and buyout funds. Custom benchmarks are also frequently used by private equity investors.

4.2.2. Historical Performance

Exhibit 8-12 gives U.S. private equity’s annualized IRRs as compiled by the National Venture Capital Association and Thomson Venture Economics as of 2005. In Exhibit 8-12, “balanced VC funds” are funds that make both early-stage and late-stage investments.

Private equity returns have exhibited a low correlation with publicly traded securities, making them an attractive addition to a portfolio. However, because of a lack of observable market prices for private equity, short-term return and correlation data may be a result of stale prices. Emery (2003) showed that the correlation between venture capital and NASDAQ returns increased substantially when annual or biannual (i.e., calculated every two years)
data were used rather than quarterly data. Emery showed that venture capital returns demonstrated a 0.69 correlation with NASDAQ returns and a 0.40 correlation with S&P 500 returns based on quarterly data. When biannual data were used, the correlation was 0.93 with the NASDAQ and 0.64 with the S&P 500.

4.2.3. Interpretation Issues  The private equity investor thinks of returns in terms of IRR calculations based, generally, on estimates of the values of the investor’s interest. However, the fund manager’s appraisals (usually supplied on a quarterly basis) supply estimates, not a market price. Appraised values are often slow to adjust to new circumstances (use stale data) and focus only on company-specific events, so the returns may be erroneous. Furthermore, there is no generally accepted standard for appraisals.

In evaluating past records of returns of private equity funds, investors often make comparisons with funds closed in the same year (the funds’ vintage year). This helps assure the funds are compared with other funds at a similar stage in their life cycle. The effects of vintage year on returns are known as vintage year effects, and include, in addition to the effects of life-cycle stage, the influence that economic conditions and market opportunities associated with a given vintage year may have on various funds’ probabilities of success.

4.3. Private Equity: Investment Characteristics and Roles

Like public equity investment, but to a greater degree, private equity plays a growth role in investment portfolios. On the one hand, at the company level, the highest earnings growth rates are usually achievable early, when the markets for the company’s products may be largely untapped and competition may be slight. When a promising private company comes to market, its prospective growth may be capitalized at an above-market-average multiple. On the other hand, investment in established companies via buyout funds generally involves less risk and earlier returns. The private equity investor hopes to gauge and control the risk through appropriate due diligence processes. The following section provides more details on investment characteristics.

4.3.1. Investment Characteristics  The general investment characteristics of private equity investments include the following:

- **Illiquidity.** Private equity investments are generally highly illiquid. Convertible preferred stock investments do not trade in a secondary market. Private equity fund investors have more restricted opportunities to withdraw investments from the fund than do hedge fund investors. This is natural, because the underlying investments are not liquid.
- **Long-term commitments required.** Private equity investment generally requires long-term commitments. For direct VC investments, the time horizon also can be quite uncertain.
- **Higher risk than seasoned public equity investment.** The returns to private equity investments, on average, show greater dispersion than seasoned public equity investments, although they may be roughly comparable to those of publicly traded microcap shares. The risk of complete loss of investment is also higher. The failure rate of new and young businesses is high.
- **High expected IRR required.** Private equity investors target high rates of returns as compensation for the risk and illiquidity of such investments.

---

For venture capital investments, the following also holds:

- **Limited information.** Because new ventures operate in product or service markets that may break new ground in some way, projections concerning cash flows are often based on limited information or make many assumptions. Although this is a risk factor, it is also related to the potential for unusual profits, however, of successful ventures.

Venture capitalists often target rates of return of 25 to 30 percent or more in individual investments. Dramatic success stories of venture capital include companies such as Apple Computers, Intel Corporation, Microsoft, and Google. Many investments do not work out. For bearing the additional risks of private equity compared with public equity, the private equity fund investor targets earning a substantial premium over expected public equity returns.

The illiquidity of private equity affects the value, of course, of an investor’s interest. The value that is determined by using models such as the venture capital method or discounted cash-flow method may be used as the estimate of the value for a marketable controlling interest. If the owner has a minority interest and the equity interest does not have a ready market, then discounts are applied to reflect the value for a minority-interest holder with a nonmarketable interest. The discount for a minority interest reflects the lack of control that investor has over the business and distributions. Studies have indicated that minority-interest discounts can range from 20 percent to 30 percent. The discount for lack of marketability (for short, marketability discount) takes account of the lack of liquidity in the investment and depends on a number of factors, such as the size of the interest and the level of dividends paid. Studies of marketability discounts have shown mean discounts in the 28 to 36 percent range. If the interest to be valued is a controlling interest, only the marketability discount needs to be considered. For a majority interest, the discount for lack of marketability might reflect both the cost of going public and a discount for owning a large block of shares. Example 8-7 illustrates one possibility for the valuation of a nonmarketable minority interest. A cautionary note is that the valuation of a nonmarketable minority interest can figure in the value of an estate and the estate taxes due for deceased private wealth clients. The calculation shown is not intended as a guide to estate planning in any given jurisdiction.

### Example 8-7  A Nonmarketable Minority Interest

Brent Smith has determined that his company will make a small investment in a private company, Clark Computing. The investment will be a nonmarketable minority interest. Smith’s investment banker estimates that the value of Clark equity, if it were publicly traded, would be £500 million. Smith’s company’s interest in Clark will be 10 percent of Clark’s equity. Smith’s investment banker determines that a minority interest discount of 20 percent and a marketability discount of 25 percent are appropriate. What is the value of the nonmarketable minority interest?

---

50The venture capital method of valuation involves discounting at a high interest rate a projected future value of the company, where the projected future value assumes the company is successful.


52Ibid, paragraph 2111.
Chapter 8  Alternative Investments Portfolio Management

**Solution:** The money amounts shown are in millions of pounds sterling.

Marketable controlling interest value: $(10\% \times 500) = 50$.

Minority interest discount: $(20\% \times 50) = -10$.

Marketable minority interest: $(50 - 10) = 40$.

Marketability discount: $(25\% \times 40) = -10$.

Nonmarketable minority interest: $(40 - 10) = 30$.

Smith’s investment banker values the investment at £30 million.

VC funds and buyout funds have some expected differences in return characteristics.\(^\text{53}\)

- **Buyout funds are usually highly leveraged.** The capital raised by the fund may be 25 to 40 percent of capital used to purchase the equity of the target company, with the balance coming from debt collateralized by the target company’s assets. The operating cash flows of the target company, typically an established company, are used to service the debt payments. In contrast, VC funds use no debt in obtaining their equity interests.

- **The cash flows to buyout fund investors come earlier and are often steadier than those to VC fund investors.** Because buyout funds purchase established companies, buyout fund investors usually realize returns earlier than VC fund investors, for which fund investments may still be in the cash-burning stage. The expected pattern of interim returns over the life of a successful venture capital fund has sometimes been described as a \(\textit{J}-\)curve, in which early returns (e.g., over the first five or six years) are negative as the portfolio of companies burns cash but later returns accelerate as companies are exited. In general, the earlier the stage in which a fund invests in companies, the greater the risk and the potential.

- **The returns to VC fund investors are subject to greater error in measurement.** The interim return calculations of private equity funds depend not only on cash-flow transactions with the fund but also on the valuations of the portfolio companies. These valuations are subject to much less uncertainty for buyout funds investing in established companies.

Thus, venture capital investing may be expected to involve more frequent losses than buyouts in return for higher upside potential when investments are successful.

**EXAMPLE 8-8  An Investment in Private Equity**

The Lee Foundation was established 10 years ago to provide grants to minority- and female-owned enterprises. A well-diversified asset allocation has resulted in successful growth in the value of the foundation’s investments. The trustees have thus decided to allocate US$5 million to private equity. Their objectives are to earn significantly high returns on a high-growth investment and to take an active and dominant role in

control of the company in which they decide to invest. They understand that such an investment requires a high level of risk tolerance and a multiyear time horizon.

1. Evaluate the suitability of the following three potential investments, with specific reference to short- and long-term returns, sources of risk, and degree of investor control:
   a. Seed investment in a new medical device recently developed by three doctors.
   b. Venture capital trust that invests exclusively in 15 to 20 start-up companies at any given time.
   c. Second-stage (follow-on) investment in a company that successfully patented a new medical device two years ago and seeks to expand its manufacturing facilities.

2. Recommend and justify the investment that is most likely to satisfy the goals of the foundation’s proposed US$5 million investment.

Solution to Problem 1:

a. The seed investment is an investment in an early-stage company with no proven “track record” or history of revenues. Therefore, there are not likely to be any immediate or short-term returns because the next stage is marketing and manufacturing this new device. If the sales of this unique device are successful, however, future long-term returns could be significant. Sources of risk include the failure of the device, future competition from other similar companies, lack of follow-on funds for marketing and manufacturing, and the possibility that the device may not receive a patent. Consequently, the level of risk is high. Because the foundation is likely to be the first outside investor, the possibility of taking an active role in the company, possibly as outside board members, is high.

b. The venture capital trust is diversified over many start-up companies and is thus probably providing some current return, with the potential for additional return in the future. Although there is considerable risk associated with start-up companies, the trust is well diversified over many companies, which mitigates the impact of risk of the failure of one or two of the start-ups. There is no outside investor control available because the trust makes all the decisions and is traded on a public exchange.

c. The second-stage investment is most likely already showing positive cash flow and net income because it is seeking financing to expand an existing manufacturing facility. Therefore, short-term returns may be attractive and projections probably indicate potential for additional long-term returns, although the level of these returns may be muted in comparison with a seed or start-up because some of the early money has already been made. Investors at the second stage may be able to negotiate some active control, although the founders and seed/start-up investors are probably directly involved in company decisions also.

Solution to Problem 2: The seed company is most consistent with the foundation’s objectives of earning a significant return in a high-growth opportunity and having the ability to take an active role in the company. Additionally, the foundation is willing to accept a high degree of risk and a longer-term perspective for future returns.
4.3.2. Roles in the Portfolio  The moderately high average correlation of private equity returns with publicly traded share returns that has been documented has an economic explanation that is at least plausible: All types of businesses have some exposure to economic and industry conditions, so correlations of public and private equity returns may be expected to be positive. Furthermore, venture capital has public equity markets as one main exit route, so returns to VC fund investors would be expected to be higher when public equity market values are advancing. Private equity bears more idiosyncratic or company-specific risk than the average seasoned public company, however, so any correlation should not be extremely high.

Private equity probably can play a moderate role as a risk diversifier. However, many investors look to private equity investment for long-term return enhancement.

Given the capacity issues already mentioned and private equity’s generally high illiquidity, target allocations of 5 percent or less are commonplace. For example, in 2004, based on money already committed, Canadian public sector pension plans averaged allocations of 3.6 percent and corporate pension plans averaged 1.3 percent.\(^{54}\)

Among the issues that must be addressed in formulating a strategy for private equity investment are the following:\(^{55}\)

- **Ability to achieve sufficient diversification.** Suppose an investor’s allocation to private equity is 5 percent. Given that institutional partnership commitments are typically not smaller than US$5 million, a reasonably diversified portfolio (5–10 investments) means commitments totaling \(5 \times \text{US$5 million} = \text{US$25 million}\) to \(10 \times \text{US$5 million} = \text{US$50 million}\). These amounts imply that the assets of the institutions investing in this kind of investment typically need to exceed US$500 million (\(\approx \text{US$25 million} \div 5\%\)). For smaller investors, a private equity fund of funds is a possible diversification choice, although it involves a second layer of fees.

- **Liquidity of the position.** Direct private equity investments are inherently illiquid. Consequently, private equity funds are also illiquid. Investors in funds must be prepared to have the capital tied up for 7 to 10 years. Although a limited secondary market for private equity commitments exists, the investments trade at highly discounted prices, which makes selling the positions an unattractive proposition.

- **Provision for capital commitment.** An investor in a private equity fund makes a commitment of capital. The cash is advanced over a period of time known as the commitment period, which is typically five years. Therefore, the investor needs to make provisions to have cash available for future capital calls.

- **Appropriate diversification strategy.** An investor contemplating an exposure to private equity should be clear on the stand-alone risk factors of an investment and also the effect on the overall risk of the portfolio. Each private equity fund will have a different investment focus, which when combined with other funds in the portfolio, modifies the overall risk. Diversification may be across industry sectors, by stage of company development, and by location:
  - Industry sector (information technology, biotechnology, alternative energy, etc.).
  - Stage (early stage, expansion, buyout, etc.).
  - Geography (locally focused, internationally focused, etc.).

The element shared by all private equity investment is the identification of promising private businesses with committed and talented owner/managers.

---

\(^{54}\)Based on Frank Russell Company data.

\(^{55}\)Andrew Abouchar, CFA, contributed to this section.
For the many private equity investors making indirect investment, the search is for fund managers who are expert in evaluating and managing private equity investments. Indirect investment can include investment not only in newly formed private equity funds but also in secondary-market private equity fund purchases from limited partners seeking liquidity.

4.3.3. Other Issues Among the major requirements for private equity investing is careful due diligence. The framework discussed in Example 8-2 applies, of course; in particular, due diligence items for private equity can usually be placed into one of the following three bins:

2. Operational review, focusing on internal processes, such as sales management, employment contracts, internal financial controls, product engineering and development, and intellectual property management.
3. Financial/legal review, including the examination of internal financial statements, audited financial statements, auditor’s management letters, prior-year budgets, documentation of past board of directors meetings, board minutes, corporate minute books, and assessment of all legal proceedings, intellectual property positions, contracts and contingent liabilities.

Some practical details and comments are as follows:

1. **Evaluation of prospects for market success:**
   - **Markets, competition, and sales prospects.** The private equity investor needs to form a judgment about the prospects for success of the company in the targeted product/service market. This review includes an evaluation of markets, competition, and sales prospects. The information in the business plan is a starting point in making such an appraisal.
   - **Management experience and capabilities.** Quality of management is often considered the single biggest factor in the success of a venture. Due diligence includes a background check on the managers and other key personnel. This should include not only references provided by the company but also independently gathered information from the investor’s own sources. The investor should use all available information in assessing the management team’s acumen. Moreover, the assessment of management does not stop when the initial investment is made; it is ongoing.
   - **Management’s commitment.** Much of the success of a private equity company depends on its managers. Therefore, a potential investor will want to gauge how committed the managers are to the company. There are several factors to use in assessing this:
     - **Percentage ownership.** How much of the company is owned by the management team? Ownership of a large portion of the company is an indication of high commitment to the company.
     - **Compensation incentives.** If management is key to the company’s success, an investor will want to ensure that the current managers’ interests align with those of the shareholders through the company compensation arrangements.
   - **Cash invested.** How much cash or “skin” has management invested in the company? Investors generally regard the fact that the managers have invested a large portion of their net worth in the company as a particularly good indicator of a highly committed management team. Conversely, if the managers have invested little of their own cash
in the company, the presumption is that they are less than wholly committed to the company’s success.

- **Opinion of customers.** When the company is already marketing a product or service, the investor should attempt to learn customer opinions of the company and its product or services.
- **Identity of current investors.** Current investors can give an indication of the company’s future success. For example, if a company’s product is a medical device dealing with the heart, it is meaningful if several leading cardiologists have already invested in the company.

2. **Operational review:**

- **Expert validation of technology.** If the company intends to market a new technology, the investor needs to obtain expert validation that the technology is valid and represents an advance.
- **Employment contracts.** Do key employees have contracts to ensure that they stay with the company? Do non-key employees have contracts with severance clauses that could burden the company’s finances?
- **Intellectual property.** In many companies, the ability to succeed hinges on proprietary information (formulas, processes, designs). An investor should determine whether the company holds relevant patents in such cases (or at least has applied for such patents). These patents could be a design for a machine, a new application of an existing technology, a drug, a medical device, or so on. Potential investors should have reasonable assurance that the company has the ability to conduct business without another company’s infringement. Often in this area, an investor will want to consult with patent experts.

3. **Financial/legal review:**

- **Potential for dilution of interest.** Potential investors also want to investigate the stock options that have been issued to managers and other potential means by which investor interests may be diluted and to ensure contractually that their investment will not be significantly diluted.
- **Examination of financial statements.** Early-stage companies, in particular, may not have audited financial statements to show. Thus, investors may want to ask for tax returns or conduct their own audits of financial records.

Due diligence for private equity funds includes the managers’ experience, capabilities, and commitment, the compensation arrangements, and compliance of the fund with Global Investment Performance Standards® in reporting performance. Fund selection is largely an exercise in evaluating the capabilities of the general manager’s management team. Factors that should be considered include the following:

- **Historical returns generated on prior funds.**
- **Consistency of returns.** Has the team had one successful fund or many?
- **Roles and capabilities of specific individuals at the fund.** The investor will want to evaluate whether the fund manager has the needed human resources to effectively select and guide private equity investment.
- **Stability of the team.** Did the current senior personnel generate the track record of the fund manager, or has there been significant personnel turnover?
As the discussion of due diligence makes clear, many characteristics of people, structure, and costs can differentiate a set of private equity investments focused on a similar market opportunity. In contrast, different examples of a commodity, such as natural gas, have highly similar characteristics. Commodity investments are the subject of the next section.

5. COMMODITY INVESTMENTS

A commodity is a tangible asset that is typically relatively homogeneous in nature. Because of their relative homogeneity, commodities lend themselves to being the subject of contracts to buy and sell that have standardized terms (as in futures market contracts). Commodity investments are direct or indirect investments in commodities.

The question of whether commodities represent a separate asset class has been extensively debated in both the academic and practitioner literature. Practically, the question is not whether commodity investment is an asset class but whether commodity investment is appropriate for a given investor. If it is, what are the best approach to implement the investment and the appropriate allocation? In some statements of strategic asset allocations, commodities may be included under a heading of “real assets” or “real assets: resources,” in which case, they may not be separately distinguished from such real investments as timberland.

Historically, commodity-linked businesses have been the major players in the cash and futures commodity markets. Individual investors in many countries have long been active in the cash markets for precious metals. In some markets, commodity trading advisers (CTAs, registered advisers to managed futures funds) are another active group. Historically and currently, institutional investors have been more active in financial futures markets than in commodity futures markets. Investment in publicly traded equities of commodity-linked businesses has probably been the most common approach for both individual and institutional investors to obtain exposure, albeit indirectly, to commodities. Only investment in commodities via cash and the derivatives markets constitutes alternative investing. Those markets are the focus of this treatment.

5.1. The Commodity Market

Investors can gain direct exposure to commodities in spot (cash) markets or in markets for deferred delivery, such as futures and forwards markets. Spot commodity trading can be traced back thousands of years, and commodity futures trading is at least as old as the rice futures trading in Japan several hundred years ago.

Commodity futures markets developed as a response to an economic need by suppliers and users of various agricultural and nonagricultural goods to transfer risk. Moreover, commodity futures markets tend to improve the functioning of the spot and forward markets. For instance, commodity futures may permit greater commodity production and trade because the use of futures hedges reduces the risk of holding spot inventories. By facilitating risk management and trading, commodity futures have grown to become an essential part of the production and marketing of agricultural and nonagricultural goods. Other types of commodity derivatives include options on commodity futures and swap markets.

56 The relative homogeneity of commodities distinguishes them from tangible assets, such as fine art and other collectibles.
Chapter 8  Alternative Investments Portfolio Management

Commodities futures are traded on agricultural products, metals, and energy resources. A commodity futures transaction may involve possible physical delivery (i.e., actual delivery of the underlying commodity) or may be “cash-settled,” which means that no delivery takes place but a settlement in cash occurs at maturity equal to the gain that a delivery transaction would entail. Although physical delivery is possible for some futures contracts, in practice most positions in futures contracts are offset prior to maturity.

5.1.1. Types of Commodity Investments There are two broad approaches to investing in commodities: direct and indirect. Direct commodity investment entails cash market purchase of physical commodities—agricultural products, metals, and crude oil—or exposure to changes in spot market values via derivatives, such as futures. Because cash market purchases involve actual possession and storage of the physical commodities and incur carrying costs (financing, insurance, and transportation) and storage costs, investors have generally preferred indirect commodity investment.

Indirect commodity investment involves the acquisition of indirect claims on commodities, such as equity in companies specializing in commodity production. As mentioned previously, indirect commodity investment was historically the principal means that most investors used to obtain exposure to commodities. There is increasing evidence, however, that indirect commodity investment—in particular, equity instruments in commodity-linked companies—does not provide effective exposure to commodity price changes. To the degree that companies hedge a major portion of their commodity risk, even commodity-linked companies may not be exposed to the risk of commodity price movement. This fact has been a spur to the creation of investable commodity indices and a current preference for gaining exposure to commodities through derivative markets. In some markets, such as the United States, even small investors can access the commodity markets via mutual funds or exchange-traded funds.

5.1.2. Size of the Commodity Market With billions of dollars worth of commodities recorded by so many countries in international trade over a given year, spot commodity markets are enormous in scope and value. In the United States alone, the notional value of open interest in commodity futures was estimated at US$350 billion as of the fourth quarter of 2005, with energy futures (natural gas, crude oil, heating oil, and gasoline) the dominant segment.

5.2. Benchmarks and Historical Performance

Although the physical markets for commodities are not centralized, information about commodity prices is transmitted around the world through commodity-based financial products. Thus, performance of commodity investments can be evaluated by using commodity indices that form the basis for many products. The development of active markets for indexed commodity investments has been a major force in broadening investor interest in commodity investment.

5.2.1. Benchmarks A variety of indices based on futures prices can be used as benchmarks for the performance of futures-based commodity investments. These include the Reuters

---

61 This section draws on CISDM (2005b).
Jeffries/Commodity Research Bureau (RJ/CRB) Index, the Goldman Sachs Commodity Index (GSCI), the Dow Jones–AIG Commodity Index (DJ-AIGCI), and the S&P Commodity Index (S&PCI).

Commodity indices attempt to replicate the returns available to holding long positions in commodities. The DJ-AIGCI, the RJ/CRB Index, the GSCI, and the S&PCI provide returns comparable to passive long positions in listed futures contracts. Because the cost-of-carry model ensures that the return on a fully margined position in a futures contract mimics the return on an underlying spot deliverable, futures contract returns are often used as a surrogate for cash market performance. (The cost-of-carry model relates the futures price to the current spot price and the cost of holding the spot commodity.) All of these indices are considered investable.

The major indices contain different groups of underlying assets. For example, the RJ/CRB Index and the GSCI include energy (oil and gas), metals (industrial and precious), grains (corn, soybeans, and wheat), and soft commodities (cocoa, coffee, cotton, and sugar). Beyond these basic groupings, commodity indices differ widely in composition, weighting scheme, and purpose.

The commodity indices also differ in the relative emphasis placed on various commodities and the procedure used to determine the weightings in the index. A market-cap weighting scheme, so common for equity and bond market indices, cannot be carried over to indices of commodity futures. Because every long futures position has a corresponding short futures position, the market capitalization of a futures contract is always zero. The RJ/CRB Index, for example, groups commodities into four sectors and gives unequal fixed weights to a sector to reflect its perceived relative importance. The GSCI uses world-production weighting. The weights assigned to individual commodities in the GSCI are based on a five-year moving average of world production. Weights are determined each July and are made effective the following January.

Commodity index providers use either arithmetic or geometric averaging to calculate the index return from the component returns. For example, the RJ/CRB Index is based on arithmetic averaging of the monthly component returns; the GSCI is an arithmetic measure of the performance of actively traded, dollar-denominated nearby commodity futures contracts. All contracts are rolled on the fifth business day of the month prior to the expiration month of the contract. Investors attempting to replicate the GSCI must rebalance their portfolios monthly to maintain constant dollar weights.

Subindices of the GSCI are calculated for agricultural, energy, industrial, livestock, and precious metals contracts. Two versions of the indices are available: a total-return version, which assumes that capital sufficient to purchase the basket of commodities is invested at the risk-free rate, and a spot version, which tracks movements in only the futures prices.

5.2.2. Historical Performance Exhibit 8-13 presents the monthly return, the annualized return, standard deviation of returns, Sharpe ratio, minimum monthly return, and correlations of the GSCI, S&PCI, and DJ-AIGCI with a sample of stock, bond, and hedge fund indices for the period January 1990 through December 2004. The results for the S&PCI and DJ-AIGCI differ meaningfully from the results for the GSCI, with the DJ-AIGCI showing comparable mean returns but lower volatility and the S&PCI evidencing both lower mean returns and the volatility.

The differences can be explained, at least in part, by differences in the components of the indices and different approaches to determining the weights of individual commodity futures contracts in each index. For example, the performance of energy has played the dominant role in results for the GSCI because its portfolio weights are based on the value of worldwide
## EXHIBIT 8-13 Commodity Index Performance, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>GSCI</th>
<th>S&amp;PCI</th>
<th>DJ-AIGCI</th>
<th>S&amp;P 500</th>
<th>Lehman Gov./Corp. Bond</th>
<th>MSCI World</th>
<th>Lehman Global Bond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized mean return</td>
<td>7.08%</td>
<td>4.78%</td>
<td>6.89%</td>
<td>10.94%</td>
<td>7.77%</td>
<td>7.08%</td>
<td>8.08%</td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>19.26%</td>
<td>12.85%</td>
<td>11.85%</td>
<td>14.65%</td>
<td>4.46%</td>
<td>14.62%</td>
<td>5.23%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.15</td>
<td>0.04</td>
<td>0.22</td>
<td>0.45</td>
<td>0.78</td>
<td>0.19</td>
<td>0.72</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−14.41%</td>
<td>−8.97%</td>
<td>−7.54%</td>
<td>−14.46%</td>
<td>−4.19%</td>
<td>−13.32%</td>
<td>−3.66%</td>
</tr>
<tr>
<td>Correlation with GSCI</td>
<td>1.00</td>
<td>0.84</td>
<td>0.89</td>
<td>−0.08</td>
<td>0.03</td>
<td>−0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Correlation with S&amp;PCI</td>
<td>0.84</td>
<td>1.00</td>
<td>0.91</td>
<td>0.03</td>
<td>0.02</td>
<td>0.05</td>
<td>0.07</td>
</tr>
<tr>
<td>Correlation with DJ-AIGCI</td>
<td>0.89</td>
<td>0.91</td>
<td>1.00</td>
<td>0.08</td>
<td>0.03</td>
<td>0.15</td>
<td>0.12</td>
</tr>
</tbody>
</table>

*Note:* MSCI World is the MSCI World equity index.

EXHIBIT 8-14  Performance of GSCI Subindices, 1990–2004

<table>
<thead>
<tr>
<th>Subindex</th>
<th>Annualized Return</th>
<th>Annualized Std. Dev.</th>
<th>Sharpe Ratio</th>
<th>Minimum Monthly Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSCI Agricultural</td>
<td>−2.49%</td>
<td>13.99%</td>
<td>−0.49</td>
<td>−10.57%</td>
</tr>
<tr>
<td>GSCI Energy</td>
<td>9.77</td>
<td>32.48</td>
<td>0.17</td>
<td>−22.14%</td>
</tr>
<tr>
<td>GSCI Industrial Metals</td>
<td>5.42</td>
<td>16.98</td>
<td>0.07</td>
<td>−12.89%</td>
</tr>
<tr>
<td>GSCI Livestock</td>
<td>3.58</td>
<td>13.75</td>
<td>−0.05</td>
<td>−12.76%</td>
</tr>
<tr>
<td>GSCI Nonenergy</td>
<td>1.21</td>
<td>9.04</td>
<td>−0.34</td>
<td>−6.27%</td>
</tr>
<tr>
<td>GSCI Precious Metals</td>
<td>1.66</td>
<td>12.68</td>
<td>−0.21</td>
<td>−11.03%</td>
</tr>
</tbody>
</table>

Source: CISDM (2005b).

production for each included commodity. Based on that criterion, the weight of energy-related futures has exceeded two-thirds.⁶² Energy was a good performer over the period examined. The DJ-AIGCI’s weights reflect primarily futures contract liquidity data as supplemented by production data, and the influence of energy on the DJ-AIGCI’s results, although important, is less than for the GSCI.⁶³ Each index represents a somewhat distinct view of the world commodity marketplace.

On a stand-alone basis, as judged by the Sharpe ratio, commodities have underperformed U.S. and world bonds and equities (except for the DJ-AIGCI versus the MSCI World Index). In terms of the minimum monthly return, the GSCI registered −14.41 percent, which is not significantly different from the S&P 500’s −14.46 percent but is higher than the minimum monthly return of either U.S. or global bonds.

The correlations of the three commodity indices with the traditional asset classes are of a similar order of magnitude and close to zero, indicating potential as risk diversifiers.

Exhibit 8-14, which presents the performance statistics for the six GSCI sector subindices, shows considerable difference in stand-alone risk and return among them (particularly between the GSCI Energy Index and the other subindices). Energy plays a major role in the positive Sharpe ratio and the high volatility of the GSCI shown in Exhibit 8-13.

Another message of Exhibit 8-14 is that one cannot think of commodities as a homogeneous market of similar investments. In data not reported, the average correlation of GSCI commodity sector returns is low.

5.2.2.1. Recent Performance (2000–2004)  Exhibit 8-15 shows that during this recent period, all commodity indices outperformed U.S. and world equities but not bonds. The stand-alone comparisons with traditional asset classes appear to be time-period dependent. The consistent feature in the evidence is correlation. Although the commodities’ correlations with bonds have gone up in comparison with the longer (1990 to 2004) period, the generally low correlations among commodities and traditional asset classes in Exhibit 8-15 is consistent with the evidence for the longer time period.

5.2.2.2. Commodity Index Return Components  In general, the return on a commodity futures contract is not the same as the return on the underlying spot commodity. A commodity

⁶²According to Erb and Harvey (2006), Table 8-2, the weight of energy-related futures in the GSCI exceeded two-thirds as of May 2004.

⁶³Erb and Harvey, ibid., Table 8-4, show a weight of energy for the DJ AIGCI of less than 40 percent as of May 2004.
EXHIBIT 8-15  Recent Commodity Index Performance, 2000–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>GSCI</th>
<th>S&amp;PCI</th>
<th>DJ-AIGCI</th>
<th>S&amp;P 500</th>
<th>Lehman Gov./ Corp. Bond</th>
<th>MSCI World</th>
<th>Lehman Global Bond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized mean return</td>
<td>13.77%</td>
<td>10.27%</td>
<td>12.63%</td>
<td>-2.30%</td>
<td>-2.05%</td>
<td>8.47%</td>
<td></td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>22.10%</td>
<td>16.62%</td>
<td>13.85%</td>
<td>16.35%</td>
<td>4.76%</td>
<td>15.62%</td>
<td>6.02%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.50</td>
<td>0.06</td>
<td>0.72</td>
<td>-0.31</td>
<td>1.11</td>
<td>-0.30</td>
<td>0.96</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>-14.41%</td>
<td>-8.71%</td>
<td>-7.54%</td>
<td>-10.87%</td>
<td>-4.19%</td>
<td>-10.98%</td>
<td>-3.66%</td>
</tr>
<tr>
<td>Correlation with GSCI</td>
<td>1.00</td>
<td>0.89</td>
<td>0.89</td>
<td>-0.05</td>
<td>0.05</td>
<td>0.00</td>
<td>0.10</td>
</tr>
<tr>
<td>Correlation with S&amp;PCI</td>
<td>0.89</td>
<td>1.00</td>
<td>0.94</td>
<td>0.03</td>
<td>0.07</td>
<td>0.08</td>
<td>0.18</td>
</tr>
<tr>
<td>Correlation with DJ-AIGCI</td>
<td>0.89</td>
<td>0.94</td>
<td>1.00</td>
<td>0.09</td>
<td>0.05</td>
<td>0.14</td>
<td>0.20</td>
</tr>
</tbody>
</table>

Source: CISDM (2005b).
EXHIBIT 8-16 Calculation of Roll Return

<table>
<thead>
<tr>
<th>Contract Maturity</th>
<th>Futures Price as of May 200X</th>
<th>Futures Price as of April 200X</th>
<th>Change in Spot Price</th>
<th>Roll Return/Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 200X</td>
<td>US$40.58</td>
<td>US$39.10</td>
<td>US$0.40</td>
<td>US$1.08</td>
</tr>
<tr>
<td>Sept. 200X</td>
<td>US$39.67</td>
<td>US$38.70</td>
<td>US$0.40</td>
<td>US$0.57</td>
</tr>
<tr>
<td>Dec. 200X</td>
<td>US$38.45</td>
<td>US$37.65</td>
<td>US$0.40</td>
<td>US$0.40</td>
</tr>
</tbody>
</table>

futures investor needs to understand, in particular, how the returns on a futures contract–based commodity index are calculated. The returns have three components: the spot return, the collateral return, and the roll return.

The **spot return** or **price return** derives from changes in commodity futures prices that come from changes in the underlying spot prices via the cost-of-carry model.\(^{64}\) Because of the cost of owning and storing spot commodities, when the spot price goes up (down), so does the futures price, which gives rise to a positive (negative) return to a long futures position. The change in spot prices should be reflected in the change in the price of the futures price with the shortest time to maturity (the nearby futures contract) over the time period. Anson (2002a) noted that most of the shocks with respect to physical commodities tend to be events that reduce the current supply and cause prices to rise; thus, physical commodities have positive event risk.

**Collateral return** or **collateral yield** comes from the assumption that the full value of the underlying futures contract is invested to earn the risk-free interest rate—that is, that an investor long a futures contract posts 100 percent margin in the form of T-bills (in such a case the futures position is said to be fully collateralized). The implied yield is the collateral return.

**Roll return** or **roll yield** arises from rolling long futures positions forward through time. The concept is best explained through an example. Consider the data given in Exhibit 8-16, which shows a downward-sloping term structure of futures prices (i.e., the more distant the contract maturity, the lower the futures price), a situation known as **backwardation**.

A monthly roll return is computed as the change in the futures contract price over the month minus the change in the spot price over the month. Suppose an investor establishes a position in the June 200X contract in April 200X when the futures price is US$39.10. Between April 200X and May 200X, the futures price increases to US$40.58, for a gain of US$1.48, of which US$0.40 is attributable to a US$0.40 increase in the spot price (perhaps because the supply has been reduced as a result of bad weather). Note that the closer the futures contract is to maturity, the greater the roll return/yield is. In this example, the roll return on the June contract (US$1.08) is greater than the next position, the September contract (US$0.57), which is, in turn, greater than that of the December contract (US$0.40).

When the futures markets are in backwardation, a positive return will be earned from a simple buy-and-hold strategy. The positive return is earned because as the futures contract gets closer to maturity, its price must converge to that of the spot price of the commodity. Because in backwardation the spot price is greater than the futures price, the futures price must increase in value. (The opposite is true with an upward-sloping term structure of futures prices.)

---

\(^{64}\)Recall that the cost-of-carry model is \(F = Se^{r+c-y}(T-t)\), where \(F\) is the futures price, \(S\) is the current spot price of the underlying commodity, \(r\) is the risk-free rate of return, \(c\) is the cost of storage, \(y\) is the convenience yield, and \(T-t\) is the time to maturity of the contract. For more details, see Chance (2003).
prices, or contango.) All else being equal, an increase in a commodity’s convenience yield (the nonmonetary benefit from owning the spot commodity) should lead to futures market conditions offering higher roll returns; the converse holds for a decline in convenience yields. (Convenience yields are discussed later.) Over the 1990 to 2004 period, there was an overall positive relationship between the mean monthly roll return and intramonth spot price volatility in the GSCI Energy and Industrial Metals subindices; because of the importance for the GSCI of the sectors associated with these subindices, the relationship held for the GSCI overall. In general, the effect is more pronounced for nonperishable, storable commodities, whose convenience yield rises in periods of increased volatility because of demand and supply shocks.

Using the data in Exhibit 8-17, we can illustrate the calculation of the total return for the GSCI.

The total return on a commodity index = Collateral return + Roll return + Spot return. Thus, for 2000, the total return on the GSCI = 8.6% + 14.2% + 26.9% = 49.7%.

### 5.2.3. Interpretation Issues

The use of the commodity indices as benchmarks assumes that commodities are approved in the investor’s investment policy statement as a distinct asset class in which the investor may invest. If commodities do not receive separate treatment but are included within some broader asset class, such as real assets, evaluation of performance should be based on a customized benchmark that reflects the other assets included in the asset class.

In interpreting historical results, such as those presented here, the investor should also be sensitive to differences in economic conditions between the historical period and current and forecasted future period.

### 5.3. Commodities: Investment Characteristics and Roles

Some experts are now advising investors to afford commodity investment a larger allocation in their portfolios than they have heretofore given it. (Allocations to commodities in most institutional and individual portfolios have typically been well under 5 percent.) In the following sections, we discuss the characteristics of commodities as investments.

For the reasons discussed earlier, direct investment in commodities for most investors will be via the futures markets. For investors seeking passive exposure to commodities, the liquidity of the market for futures contracts on a given commodity index will be a major consideration. The three most widely used futures contracts are those based on the GSCI, the DJ-AIGCI, and the RJ/CRB Index, with the GSCI representing approximately 85 percent of the combined open interest of these contracts as of the time of this writing.

---

EXHIBIT 8-17 Calculation of Commodity Index Total Return

<table>
<thead>
<tr>
<th>Year</th>
<th>GSCI Total Annual Return</th>
<th>GSCI Collateral Yield</th>
<th>GSCI Roll Return/Yield</th>
<th>GSCI Spot Annual Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>15.1%</td>
<td>7.3%</td>
<td>2.9%</td>
<td>4.9%</td>
</tr>
<tr>
<td>2000</td>
<td>49.7</td>
<td>8.6</td>
<td>14.2</td>
<td>26.9</td>
</tr>
<tr>
<td>Average</td>
<td>15.3</td>
<td>7.6</td>
<td>3.0</td>
<td>4.7</td>
</tr>
</tbody>
</table>

Source: Anson (2002a).
5.3.1. Investment Characteristics  The discussion of the historical performance of commodities highlighted the need for active investors to understand the investment characteristics of commodities on a sector- or individual-commodity level. However, there are some common themes. The chief two relate to characteristics that affect use of commodities in managing portfolio risk and serving as an inflation hedge.

5.3.1.1. Special Risk Characteristics  With some consistency, commodities have tended to have correlations with equities and bonds that are unusually low even in the realm of alternative investments. But the risk characteristics of commodities are more nuanced than simple correlation statistics can reveal and indicate several attractive features of commodities. In periods of financial and economic distress, commodity prices tend to rise, potentially providing valuable diversification services in such times. Long-term growth in world demand for certain commodities in limited supply, such as petroleum-related commodities, may be a factor in their long-term trend growth.

Nevertheless, commodities are generally business-cycle sensitive. The reason commodities behave differently under different economic conditions has to do with the sources of their returns. The determinants of commodity returns include the following:

1. Business cycle–related supply and demand. Commodity prices are determined by the supply and demand of the underlying commodities. Because the supply and demand conditions are determined by different economic fundamentals from those affecting stocks and bonds, commodity prices are expected to be sensitive to the business cycle but have little or even negative correlation with stocks and bonds. For example, the variation in spot and futures prices of industrial metals has a strong business-cycle component. Anson (2002a) suggested three reasons commodity returns have been weakly correlated with stock and bond returns. First, commodity prices correlate positively with inflation whereas stocks and bonds are negatively correlated with inflation. Second, commodity prices and stock/bond prices react differently in different phases of the business cycle. Commodity future prices are more affected by short-term expectations, whereas stock and bond prices are affected by long-term expectations. Finally, commodity prices tend to decline during times of a weak economy.

2. Convenience yield. The theory of storage splits the difference between the futures price and the spot price into three components: the forgone interest from purchasing and storing the commodity, storage costs, and the commodity’s convenience yield. Convenience yield reflects an embedded consumption-timing option in holding a storable commodity. Furthermore, the theory predicts an inverse relationship between the level of inventories and convenience yield: At low inventory levels, convenience yields are high, and vice versa. A related implication is that the term structure of forward price volatility generally declines with time to expiration of the futures contract—the so-called Samuelson effect. This is caused by the expectation that, although at shorter horizons mismatched supply and demand forces for the underlying commodity increase the volatility of cash prices, these forces will fall into equilibrium at longer horizons.

3. Real options under uncertainty. Oil futures markets are often backwardated; in these markets, futures prices are often below the current spot price. This may be caused by the existence of real options under uncertainty. A real option is an option involving

---

67 See Kaldor (1939), Working (1948, 1949), and Telser (1958).
decisions related to tangible assets or processes. In other words, producers are holding valuable real options—options to produce or not to produce—and will not exercise them unless the spot prices start to climb up. Production occurs only if discounted futures prices are below spot prices, and backwardation results if the risk of future prices is sufficiently high. A major consequence of a downward-sloping term structure of futures prices is the opportunity to capture a positive roll return as investment in expiring contracts is moved to cheaper new outstanding contracts.

The role of commodities in regard to protecting portfolio value against unexpected inflation has been a continuing theme of comments on the characteristics of commodities as investments. Among the reasons for including commodities in a portfolio are that they are:69

- “Natural” sources of return (i.e., related to economic fundamentals) over the long term, as discussed above.
- Providers of protection for a portfolio against unexpected inflation.

The premise that investments in physical commodities may hedge inflation is natural. The prices of some commodities, such as crude oil, may have significant links to the component costs of official price indices, and certain commodities, such as gold, have been traditionally demanded as stores of value by investors during inflationary times.

### EXAMPLE 8-9 An Investment in Energy Commodities

Nancy Lopez, CIO of a university endowment fund, is reviewing investment data with the university’s treasurer, Sergio Garcia. They are discussing performance of the fund’s investment in oil futures. Garcia refers to Exhibit 8-18 and states: “I thought prices for futures contracts maturing in more distant months were usually higher than prices for nearer-month contracts, but this exhibit shows the opposite case. Spot prices are even higher than the futures. What is this situation called, and what is causing it?”

**EXHIBIT 8-18 Futures Data**

<table>
<thead>
<tr>
<th>Contract Maturity</th>
<th>Futures Price as of July 200X</th>
<th>Futures Price as of June 200X</th>
<th>Change in Spot Price</th>
<th>Roll Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct. 200X</td>
<td>US$27.88</td>
<td>US$27.01</td>
<td>US$0.35</td>
<td>US$ ?</td>
</tr>
</tbody>
</table>

1. Compute the roll return from the information in Exhibit 8-18.
2. Characterize the term structure of futures prices.

---

69See Strongin and Petsch (1995), who also include pricing inefficiencies (opportunities for active management), a feature that is particularly relevant to managed futures investing, which is discussed later.
3. Discuss one reason the situation shown in Exhibit 8-18 might exist.

Garcia then asks, “In this situation, it seems our investment in energy commodities can only show negative returns. Is this true? Given the recent hurricane activity, I thought our investments would be making money.”

4. Recommend a futures strategy that will provide a positive return in this scenario.

Justify your recommendation with reference to the roll return calculated in Part 1, and formulate your response by explaining the benefit of this strategy in an environment of a declining term structure of futures prices.

Solution to Problem 1: The roll returns are as follows:

August contract = US$28.9 − US$27.9 − US$0.35 = US$0.65.
September contract = US$28.55 − US$27.65 − US$0.35 = US$0.55.
October contract = US$27.88 − US$27.01 − US$0.35 = US$0.52.

Solution to Problem 2: The term structure of futures prices is downward sloping. The oil futures market is in backwardation.

Solution to Problem 3: Oil producers hold valuable real options to produce or not to produce. They may not exercise this option unless spot prices begin to rise. Production may occur only if futures prices are below the current spot price, which is associated with a downward-sloping term structure of futures prices.

Solution to Problem 4: When futures markets are in backwardation, a positive return will be earned from a simple buy-and-hold strategy. This occurs because as the futures contract gets closer to maturity, its price will rise to converge with the higher spot price. This increase in value produces a positive roll return, as calculated in the solution to Problem 1.

5.3.1.2. Commodities as an Inflation Hedge

The premise that commodities are an inflation hedge can be tested by calculating the correlation of spot GSCI returns, as well as stock, bond, and hedge fund returns, with a proxy for unexpected inflation. The proxy we have used is the monthly change in the rate of inflation. For the 1990 to 2004 period, correlations were calculated by using data in months in which the change in the rate of inflation was beyond 1 standard deviation from the average change. The results are presented in the last column of Exhibit 8-19.

Stocks and bonds in Exhibit 8-19 exhibit a negative correlation with unexpected inflation (−0.23 and −0.06, respectively), as do some commodity classes (e.g., agriculture, livestock, and nonenergy). However, storable commodities directly related to the intensity of economic activity exhibit positive correlation with unexpected inflation (0.15 for precious metals and 0.46 for energy). Similarly, industrial metals have a correlation of 0.11. These results suggest

---

70There is extensive research on commodities as an inflation hedge covering a variety of time periods and markets; overall, it supports the proposition that at least some commodities or commodity index investments have value as inflation hedges. See Becker and Finnerty (2000) and references therein.

71Inflation was measured by changes in the U.S. Consumer Price Index.
<table>
<thead>
<tr>
<th>Index</th>
<th>S&amp;P</th>
<th>Lehman Gov./Corp</th>
<th>Change in Credit Spread (Baa–Aaa)</th>
<th>Change in Term Spread</th>
<th>Change in Bond Volume</th>
<th>Change in Stock Volume</th>
<th>Unexpected Inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSCI</td>
<td>-0.08</td>
<td>0.03</td>
<td>-0.09</td>
<td>-0.03</td>
<td>-0.05</td>
<td>-0.13</td>
<td>0.44</td>
</tr>
<tr>
<td>GSCI Agric.</td>
<td>0.18</td>
<td>-0.03</td>
<td>-0.01</td>
<td>0.02</td>
<td>0.01</td>
<td>0.00</td>
<td>-0.27</td>
</tr>
<tr>
<td>GSCI Energy</td>
<td>-0.11</td>
<td>0.03</td>
<td>-0.08</td>
<td>-0.03</td>
<td>-0.03</td>
<td>-0.09</td>
<td>0.46</td>
</tr>
<tr>
<td>GSCI Industrial Metals</td>
<td>0.21</td>
<td>-0.14</td>
<td>-0.22</td>
<td>0.19</td>
<td>0.07</td>
<td>-0.13</td>
<td>0.11</td>
</tr>
<tr>
<td>GSCI Livestock</td>
<td>0.01</td>
<td>0.01</td>
<td>-0.02</td>
<td>-0.01</td>
<td>-0.03</td>
<td>-0.03</td>
<td>-0.12</td>
</tr>
<tr>
<td>GSCI Nonenergy</td>
<td>0.20</td>
<td>-0.03</td>
<td>-0.09</td>
<td>0.05</td>
<td>-0.01</td>
<td>-0.08</td>
<td>-0.23</td>
</tr>
<tr>
<td>GSCI Precious Metals</td>
<td>-0.08</td>
<td>0.04</td>
<td>0.09</td>
<td>-0.02</td>
<td>-0.02</td>
<td>-0.06</td>
<td>0.15</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>1.00</td>
<td>0.13</td>
<td>-0.14</td>
<td>-0.05</td>
<td>0.00</td>
<td>-0.29</td>
<td>-0.23</td>
</tr>
<tr>
<td>Lehman Gov./Corp.</td>
<td>0.13</td>
<td>1.00</td>
<td>0.00</td>
<td>-0.96</td>
<td>-0.11</td>
<td>-0.02</td>
<td>-0.06</td>
</tr>
<tr>
<td>HFCI</td>
<td>0.59</td>
<td>0.17</td>
<td>-0.24</td>
<td>-0.08</td>
<td>-0.17</td>
<td>-0.35</td>
<td>0.19</td>
</tr>
</tbody>
</table>

Notes: Monthly changes in inflation beyond 1 standard deviation of the average were used to proxy for unexpected inflation. The HFCI is the Hedge Fund Composite Index computed by CISDM.
Source: CISDM (2005b).
that direct investment in energy—and, to a lesser degree, industrial and precious metals—may provide a significant inflation hedge.

As shown in Exhibit 8-19, the returns to the GSCI reflect the inflation-hedging properties of its dominant sector, energy. The broad conclusion from the time period examined, 1990–2004, is that commodity sectors differ in inflation-hedging properties, with storable commodities (such as energy) that are directly linked to the intensity of economic activity having superior inflation-hedging properties.

5.3.2. Roles in the Portfolio

The principal roles that have been suggested for commodities in the portfolio are as:

- A potent portfolio risk diversifier.
- An inflation hedge, providing an expected offset to the losses to such assets as conventional debt instruments, which typically lose value during periods of unexpected inflation.72

There is support both in the historical record and economics for these roles. Research also indicates a link between the two roles, which suggests that most investable commodity indices provide diversification advantages to stock and bond investment primarily during periods of unexpected changes in inflation.73 To the degree that inflation is already incorporated into the yield structure of bonds and the cash flow of companies—that is, inflation is fully anticipated—the economy may have periods of high commodity prices or price increases with positive stock and bond returns. Halpern and Warsager (1998) observed that commodity indices add their most value as inflation hedges in traditional stock and bond portfolios during periods of unexpected changes in inflation.

More ambiguous is a role of passive long-only commodity futures investments in increasing the expected return vis-à-vis a portfolio of traditional and other alternative investments. Erb and Harvey (2005) claimed that the average historical excess returns of individual commodity futures is approximately zero. They suggest that the measured positive excess return of portfolios of these futures for some time periods is a result not of a risk premium but of the portfolio weighting selected and of rebalancing to it.

Long-term investors with liabilities indexed to inflation, such as DB plans, may be able to improve their risk–return trade-off by including commodities in the portfolio.74 For university endowments, which support the inflation-sensitive costs of operating a university, commodities can have a role as a good risk diversifier in a portfolio that needs inflation protection. The role of commodities in a private wealth client’s portfolio awaits further study, but passive investment programs have generally been infrequently marketed to that group.

Below, using the methodology familiar from the section on real estate, we provide some quantitative information on the ex post role of commodities as a risk diversifier.

In Exhibit 8-20, the benefits of commodity investment are examined by using the GSCI (a long-only futures-based investable commodity index) in combination with equities, bonds, and hedge funds in various weights for the period January 1990 through December 2004.75

As presented in Exhibit 8-14 from a stand-alone perspective, whether risk-adjusted or not, commodities underperformed U.S. and world bond and equity markets during the sample

73 For example, see Halpern and Warsager (1998).
74 See Nijman and Swinkels (2003), pp. 1–36.
75 The GSCI futures contract has been the most active commodity index futures listed in the United States for 2004 in terms of outstanding open interest and total volume.
EXHIBIT 8-20  Commodities Performance in Portfolios, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>Portfolio I</th>
<th>Portfolio II</th>
<th>Portfolio III</th>
<th>Portfolio IV</th>
<th>Portfolio V</th>
<th>Portfolio VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>9.64%</td>
<td>9.51%</td>
<td>9.99%</td>
<td>7.86%</td>
<td>8.07%</td>
<td>8.56%</td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>7.94%</td>
<td>7.19%</td>
<td>6.87%</td>
<td>8.29%</td>
<td>7.55%</td>
<td>7.16%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.67</td>
<td>0.73</td>
<td>0.83</td>
<td>0.43</td>
<td>0.50</td>
<td>0.60</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−6.25%</td>
<td>−6.18%</td>
<td>−6.28%</td>
<td>−5.61%</td>
<td>−5.67%</td>
<td>−5.77%</td>
</tr>
<tr>
<td>Correlation with GSCI</td>
<td>−0.07</td>
<td>0.47</td>
<td>0.22</td>
<td>−0.03</td>
<td>0.48</td>
<td>0.24</td>
</tr>
</tbody>
</table>

Notes:
Portfolio I: 50 percent S&P 500, 50 percent Lehman Gov./Corp. Bond.
Portfolio II: 40 percent S&P 500, 40 percent Lehman Gov./Corp., and 20 percent GSCI.
Portfolio III: 40 percent S&P 500, 40 percent Lehman Gov./Corp., 10 percent GSCI, 10 percent HFCI.
Portfolio IV: 50 percent MSCI World, 50 percent Lehman Global Bond.
Portfolio V: 40 percent MSCI World, 40 percent Lehman Global, 20 percent GSCI.
Portfolio VI: 40 percent MSCI World, 40 percent Lehman Global, 10 percent GSCI, 10 percent HFCI.
Source: CISDM (2005b).

EXHIBIT 8-21  Recent Commodities Performance in Portfolios, 2000–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>Portfolio I</th>
<th>Portfolio II</th>
<th>Portfolio III</th>
<th>Portfolio IV</th>
<th>Portfolio V</th>
<th>Portfolio VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>3.15%</td>
<td>5.66%</td>
<td>4.81%</td>
<td>3.43%</td>
<td>5.88%</td>
<td>5.03%</td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>7.93%</td>
<td>7.60%</td>
<td>6.94%</td>
<td>8.56%</td>
<td>8.26%</td>
<td>7.57%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.06</td>
<td>0.39</td>
<td>0.30</td>
<td>0.09</td>
<td>0.38</td>
<td>0.31</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−4.36%</td>
<td>−5.05%</td>
<td>−4.12%</td>
<td>−4.94%</td>
<td>−5.40%</td>
<td>−4.46%</td>
</tr>
<tr>
<td>Correlation with GSCI</td>
<td>−0.04</td>
<td>0.55</td>
<td>0.30</td>
<td>0.03</td>
<td>0.56</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Notes:
Portfolio I: 50 percent S&P 500, 50 percent Lehman Gov./Corp. Bond.
Portfolio II: 40 percent S&P 500, 40 percent Lehman Gov./Corp., 20 percent GSCI.
Portfolio III: 40 percent S&P 500, 40 percent Lehman Gov./Corp., 10 percent GSCI, 10 percent HFCI.
Portfolio IV: 50 percent MSCI World, 50 percent Lehman Global Bond.
Portfolio V: 40 percent MSCI World, 40 percent Lehman Global, 0 percent GSCI.
Portfolio VI: 40 percent MSCI World, 40 percent Lehman Global, 10 percent GSCI, 10 percent HFCI.
Source: CISDM (2005b)

period. However, the low or negative correlations of GSCI returns with returns to the S&P 500 (−0.08), Lehman Government/Corporate Bond Index (0.03), HFCI (0.09), MSCI World Index (−0.06), and Lehman Global Bond Index (0.06) suggested diversification benefits and the potential for improvement in the Sharpe ratio by including commodities. Exhibit 8-20 supports those conclusions.

Exhibit 8-21 examines the evidence for a more recent time period. When added to a U.S. portfolio of stocks and bonds, the GSCI helps reduce the standard deviation of the portfolio from 7.93 percent (Portfolio I) to 7.60 percent (Portfolio II). Additionally, risk-adjusted performance (Sharpe ratio) improves significantly from 0.06 (Portfolio I) to 0.39 (Portfolio II). Similarly, when added to a global stock/bond portfolio, the GSCI reduces volatility from 8.56 percent (Portfolio IV) to 8.26 percent (Portfolio V) and increases the Sharpe ratio from
0.09 to 0.38. Adding more assets, such as hedge funds, to the portfolio results in worse performance (Portfolio VI versus Portfolio V).

This discussion has focused on passive long-only exposures. Commodities also offer potential for active management that may involve short as well as long positions. For example, research for the United States has indicated that the benefits to adding commodity futures, particularly metals and agricultural futures (both managed and unmanaged), to a portfolio accrue almost exclusively when the U.S. Federal Reserve (the central bank) is following a restrictive monetary policy. Such results suggest an active strategy based on central bank actions and monetary conditions. As another example, an investor who believes that a commodity’s price reverts to the underlying production costs might implement an active long–short commodity program based on divergences from production cost value. Frequently, active programs involve momentum strategies that typically go long after recent prior returns have been positive and short after recent prior returns have been negative.

Active programs may be executed within a separately managed account or a private commodity pool. Private commodity pools will be the focus of the section on managed futures programs later in the chapter.

In the next section we discuss one of the most important types of alternative investments, the hedge fund.

6. HEDGE FUNDS

Hedge funds as a group have become a booming segment of the alternative investment market, with appeal to many segments of the private wealth and institutional investor markets. The impact of hedge funds has been broad in scope. The trading activity of hedge funds constitutes a substantial portion of trading volume in a number of traditional investment markets. Services to hedge funds, known as prime brokerage, have become an important and actively contested revenue source among major sell-side investment firms. The competition from hedge funds has caused an increasing number of equity and bond mutual funds to seek approval from shareholders to make increased use of derivative strategies and short selling.

The first hedge fund was established in the late 1940s as a long–short hedged equity vehicle. More recently, institutional investors—corporate and public pension funds, endowments and trusts, and bank trust departments—have included hedge funds as one segment of a well-diversified portfolio.

There is no precise legal or universally accepted definition of a hedge fund, and hedge funds can take many forms. Originally, hedge funds were private partnerships that took long and short equity positions to reduce net market exposure in exchange for accepting a lower rate of investment return. In other words, they were “hedged” funds. Today, the term hedge fund is much broader. Rather than indicating use of hedging in the portfolio, the organizational and structural characteristics of the portfolio define it as a hedge fund.

Generally, hedge funds intentionally adopt structures that permit them to be loosely regulated pooled investment vehicles, although a trend toward greater regulatory oversight is

---

76 See Jensen, Mercer, and Johnson (2002).
77 Prime brokerage (or prime brokering) is a suite of services that is often specified to include support in accounting and reporting, leveraged trade execution, financing, securities lending (related to short-selling activities), and start-up advice (for new entities).
in motion. The nature of hedge funds as private pools has permitted this investment vehicle to avoid certain reporting and other requirements, as well as some restrictions on incentive fees, that apply to many other investment vehicles. For example, unlike traditional mutual funds, most hedge fund vehicles can take aggressive long or short positions and use leverage aggressively.

Managed futures are now frequently classified as hedge funds. However, this chapter will discuss them in a separate section to give them adequate coverage.

Each hedge fund strategy is constructed to take advantage of certain market opportunities. Hedge funds use different investment strategies and thus are often classified according to investment style. There is substantial diversity in risk attributes and investment opportunities among styles, which reflects the flexibility of the hedge fund format. In general, this diversity benefits investors by increasing the range of choices among investment attributes. We will explain the diversity in more detail.

6.1. The Hedge Fund Market

The hedge fund market has experienced tremendous growth in the past 15 years and keeps evolving. The market has witnessed a proliferation of hedge funds and products offered by hedge funds. As more hedge funds with similar strategies enter the market, returns on their once-unique strategies start to shrink. Liquidity and capacity constraints have affected some hedge funds and driven some of them to become—voluntarily or involuntarily—defunct. Some have been able to return the money to their investors, but others, unfortunately, could not and did not. Nevertheless, new hedge funds continue to be established and to try their new strategies, with the successful ones being mimicked by imitators. Although many hedge funds maintain that their strategies seek “absolute returns” that require no benchmark, some institutional investors who invest in hedge funds are asking for relative performance evaluation, which requires some benchmarking.

6.1.1. Types of Hedge Fund Investments

Many style classifications of hedge funds exist; the following classification of hedge fund style will be the basis for most of our discussion. Keep in mind that industry usage applies the term arbitrage somewhat loosely to mean, roughly, a “low-risk” rather than a “no-risk” investment operation.

- **Equity market neutral.** Equity market-neutral managers attempt to identify overvalued and undervalued equity securities while neutralizing the portfolio’s exposure to market risk by combining long and short positions. Portfolios are typically structured to be market, industry, sector, and dollar neutral. This is accomplished by holding long and short equity positions with roughly equal exposure to the related market or sector factors. The market opportunity for equity market-neutral programs comes from (1) their flexibility to take short as well as long positions in securities without regard to the securities’ weights in a benchmark and (2) the existence of pockets of inefficiencies (i.e., mispricing relative to intrinsic value) in equity markets, particularly as related to overvalued securities. Because

---

79 As of 2006 in the United States, the SEC requires hedge fund advisers to register with it, which subjects them to random audits, record-keeping and compliance requirements, and information filing requirements. As of early 2006, it was estimated that 15–20 percent of U.S. hedge fund advisers were exempt from SEC registration requirements (Kara Scannell, “Making Hedge Funds Less Secret,” Wall Street Journal, February 3, 2006, pp. C1, C5).
many investors face constraints relative to shorting stocks, situations of overvaluation may be slower to correct than those of undervaluation.

- **Convertible arbitrage.** Convertible arbitrage strategies attempt to exploit anomalies in the prices of corporate convertible securities, such as convertible bonds, warrants, and convertible preferred stock. Managers in this category buy or sell these securities and then hedge part or all of the associated risks. The simplest example is buying convertible bonds and hedging the equity component of the bonds’ risk by shorting the associated stock. The cash proceeds from the short sale remain with the hedge fund’s prime broker but earn interest, and the hedge fund may earn an extra margin through leverage when the bonds’ current yield exceeds the borrowing rate of money from the prime broker. The risks include changes in the price of the underlying stock, changes in expected volatility of the stock, changes in the level of interest rates, and changes in the credit standing of the issuer. In addition to collecting the coupon on the underlying convertible bond, convertible arbitrage strategies typically make money if the expected volatility of the underlying asset increases or if the price of the underlying asset increases rapidly. Depending on the hedge strategy, the strategy will also make money if the credit quality of the issuer improves.

- **Fixed-income arbitrage.** Managers dealing in fixed-income arbitrage attempt to identify overvalued and undervalued fixed-income securities primarily on the basis of expectations of changes in the term structure of interest rates or the credit quality of various related issues or market sectors. Fixed-income portfolios are generally neutralized against directional market movements because the portfolios combine long and short positions.

- **Distressed securities.** Portfolios of distressed securities are invested in both the debt and equity of companies that are in or near bankruptcy. Distressed debt and equity securities are fundamentally different from nondistressed securities. Most investors are unprepared for the legal difficulties and negotiations with creditors and other claimants that are common with distressed companies. Traditional investors prefer to transfer those risks to others when a company is in danger of default. Furthermore, many investors are prevented by charter from holding securities that are in default or at risk of default. Because of the relative illiquidity of distressed debt and equity, short sales are difficult, so most funds are long.

- **Merger arbitrage.** Merger arbitrage, also called **deal arbitrage,** seeks to capture the price spread between current market prices of corporate securities and their value upon successful completion of a takeover, merger, spin-off, or similar transaction involving more than one company. In merger arbitrage, the opportunity typically involves buying the stock of a target company after a merger announcement and shorting an appropriate amount of the acquiring company’s stock.

- **Hedged equity.** Hedged equity strategies attempt to identify overvalued and undervalued equity securities. Portfolios are typically not structured to be market, industry, sector, and dollar neutral, and they may be highly concentrated. For example, the value of short positions may be only a fraction of the value of long positions and the portfolio may have a net long exposure to the equity market. Hedged equity is the largest of the various hedge fund strategies in terms of assets under management.\(^{80}\)

- **Global macro.** Global macro strategies primarily attempt to take advantage of systematic moves in major financial and nonfinancial markets through trading in currencies, futures, and option contracts, although they may also take major positions in traditional equity and bond markets. For the most part, they differ from traditional hedge fund strategies in that

---

\(^{80}\)The equivalent classification termed “equity long–short” represented 28.2 percent of the Credit Suisse/Tremont Hedge Fund Index as of early 2006 (www.hedgeindex.com accessed March 12, 2006).
they concentrate on major market trends rather than on individual security opportunities. Many global macro managers use derivatives, such as futures and options, in their strategies. Managed futures are sometimes classified under global macro as a result.

- **Emerging markets.** These funds focus on the emerging and less mature markets. Because short selling is not permitted in most emerging markets and because futures and options are not available, these funds tend to be long.

- **Fund of funds.** A fund of funds (FOF) is a fund that invests in a number of underlying hedge funds. A typical FOF invests in 10 to 30 hedge funds, and some FOFs are even more diversified. Although FOF investors can achieve diversification among hedge fund managers and strategies, they have to pay two layers of fees—one to the hedge fund manager, and the other to the manager of the FOF.\(^{81}\)

There is no single standard classification system or set of labels for hedge fund strategies. One provider of hedge fund benchmarks classifies strategies into the following five broad groups:\(^{82}\)

1. *Relative value* in which the manager seeks to exploit valuation discrepancies through long and short positions. This label may be used as a supercategory for, for example, equity market neutral, convertible arbitrage, and hedged equity.
2. *Event driven* in which the manager focuses on opportunities created by corporate transactions (e.g., mergers). Merger arbitrage and distressed securities would be included in this group.
3. *Equity hedge* in which the manager invests in long and short equity positions with varying degrees of equity market exposure and leverage.
4. *Global asset allocators* which are opportunistically long and short a variety of financial and/or nonfinancial assets.
5. *Short selling* in which the manager shorts equities in the expectation of a market decline.

The five most widely used hedge fund strategies, accounting for 85 to 90 percent of assets under management in the hedge fund industry as of the early 2000s, are three equity-based strategies (equity market neutral, hedged equity, and merger arbitrage), one fixed-income strategy (convertible arbitrage), and global macro, which uses all types of assets, including currencies and commodities.

The compensation structure of hedge funds comprises a percentage of net asset value (NAV) as a management fee plus an incentive fee. The management fee is also known as an “asset under management” or AUM fee. The management fee generally ranges from 1 percent to 2 percent. The incentive fee is a percentage of profits as specified by the terms of the investment. It has traditionally been 20 percent but has recently averaged approximately 17.5 percent.\(^{83}\) Recently, roughly 50 percent of hedge funds were using a management fee of 1 percent, 1.5 percent, or 2 percent combined with an incentive fee of 20 percent.

The great majority of funds have a high-water mark provision that applies to the payment of the incentive fee. Intuitively, a high-water mark (HWM) is a specified net asset value level

\(^{81}\)Returns on FOFs have been found to be more positively correlated with equity markets than returns on hedge funds individually; see Kat (2005, pp. 51–57).

\(^{82}\)This list follows the categories established for the EACM100\(^\circledast\) Index of hedge funds by EACM Advisors LLC.

\(^{83}\)As reported by Black (2005, p. 186) based on the CISDM database as of January 2004.
that a fund must exceed before performance fees are paid to the hedge fund manager. Once the first incentive fee has been paid, the highest month-end NAV establishes a high-water mark. If the NAV then falls below the HWM, no incentive fee is paid until the fund’s NAV exceeds the HWM; then the incentive fee for a “1 plus 20” structure (a 1 percent management fee plus a 20 percent incentive fee) is 20 percent of the positive difference between the ending NAV and the HWM NAV. The new, higher NAV establishes a new HWM. A minority of funds also specify that no incentive fee is earned until a specified minimum rate of return (hurdle rate) is earned.

The purpose of a HWM provision is to ensure that the hedge fund manager earns an incentive fee only once for the same gain. For the hedge fund manager, the HWM is like a call option on a fraction of the increase in the value of the fund’s NAV. Many hedge fund managers depend on earning the incentive fee. Given a 15 percent gain, a 1 and 20 fund would earn about 4 percent of the asset versus 1 percent if no incentive fee were earned.

Hedge fund investors also often take the opportunities offered them to withdraw capital from a fund on a losing streak. A hedge fund far under its HWM is frequently dissolved. According to Credit Suisse/Tremont, more than 20 percent of hedge funds were liquidated in 2003 after a year in which more than 70 percent of hedge funds in their database failed to earn an incentive fee.84

FOFs impose management fees and incentive fees. A “1.5 plus 10” structure would not be uncommon.

Much debate has surrounded the fee structures of hedge funds. One perspective is that to the extent a hedge fund investor is not paying for “beta” (exposure to systematic risk), as the investor might do with a traditional long-only mutual fund, a higher fee structure is warranted. Another rationale is that to the extent a hedge fund contributes to controlling a portfolio’s downside risk, somewhat like a protective put, the fund manager should earn a premium, somewhat like an insurance premium.

All else being equal, between two similarly sized hedge funds following the same strategy, the expectation is that the fund charging the lower management fee will deliver superior performance, unless the higher fee manager in a particular case can make a convincing case that he or she can deliver future superior investment performance. Not uncommonly, hedge fund managers with superior past track records ask for and obtain higher-than-average incentive fees. The investor needs to ask whether the hedge fund manager will repeat as a winner.

Hedge funds also prescribe a minimum initial holding or lock-up period for investments during which no part of the investment can be withdrawn. Lock-up periods of one to three years are common. Thereafter, the fund will redeem the investments of investors only within specified exit windows—for example, quarterly after the lock-up period has ended. The rationale for these provisions is that the hedge fund manager needs to be insulated to avoid unwinding positions unfavorably. FOFs usually do not impose lock-up periods and may permit more frequent investor exits. However to offer that additional liquidity, the FOF manager must hold a cash buffer that may reduce expected returns.

6.1.2. Size of the Hedge Fund Market According to Forbes magazine, almost one-quarter of the U.S. largest 1,800 pension funds, endowments, and foundations held hedge fund investments in 2003, up from 12 percent in 2000.85 It is estimated that money under management for hedge funds grew from less than US$50 billion in 1990 to approximately

84Ibid.
US$600 billion in 2002; the number of hedge funds increased to more than 6,000.86 Hedge Fund Research estimated, as reported in Forbes, that in 2004, US$800 billion was invested in 6,300 hedge funds—900 of them less than a year old. However, 10 percent of hedge funds tracked by HedgeFund.net became defunct in that year. It is estimated that more than 8,000 hedge funds were managing more than US$1 trillion in 2005.

6.2. Benchmarks and Historical Performance

Many investors are concerned that hedge funds do not provide a means for monitoring and tracking these investments that are available for other, more traditional investments.87 In the traditional stock and bond markets, Morningstar and Lipper provide active manager–based benchmarks of mutual fund performance. Similarly, in the alternative investment industry, CISDM (the Center for International Securities and Derivatives Markets), Hedge Fund Research (HFR), Dow Jones, Standard & Poor’s, and Morgan Stanley provide monthly or daily indices that track the performance of active manager–based benchmarks of hedge fund performance.

Recently, research has also focused on developing indices for strategies (e.g., tracking portfolios) that try to separate the contribution to performance of the strategy from the contribution to performance of the manager’s specific talent.88 In most cases, evidence exists for abnormal returns based on such indices. However, investors should be cautioned that abnormal returns simply reflect that the reference benchmark is not a complete tracking portfolio for the hedge fund so the abnormal returns are simply the result of additional, nonmeasured risks.

6.2.1. Benchmarks

Hedge fund benchmarks include both monthly and daily series. In alphabetical order, a sample of monthly hedge fund indices includes the following:

- **CISDM of the University of Massachusetts.** The CISDM hedge fund and managed futures indices are based on managers reporting to the CISDM hedge fund and managed futures databases. The indices cover a broad set of hedge fund and managed futures trading strategies. Publication of returns in each style classification began in 1994 with data beginning in 1990. The broadest CISDM hedge fund index is equally weighted—the CISDM Equal Weighted Hedge Fund Index.

- **Credit Suisse/Tremont.** These indices cover more than 10 strategies and are based on a set of more than 400 funds selected from the TASS database. The Credit Suisse/Tremont Index discloses its construction methods and identifies all the funds within it. Credit Suisse/Tremont accepts only funds (not separate accounts) with a minimum of US$10 million under management and an audited statement. The Credit Suisse/Tremont Hedge Fund Index was launched in 1999 with data beginning in 1994 and is asset weighted (i.e., weights depend on assets under management).

- **EACM Advisors.** This group provides the EACM100® Index, which is an equally weighted composite of 100 hedge funds selected to be representative of five broad strategies representing 13 substrategy styles. Funds are assigned categories on the basis of how closely

87Siegel (2003) found it surprising, given that the inherent nature of hedge fund investing is hostile to benchmarking, that hedge funds or their clients need benchmarks.
they match the strategy definitions. Names in the funds are not disclosed. The index is equally weighted and rebalanced annually. It was launched in 1996 with data beginning in 1990.

- **Hedge Fund Intelligence Ltd.** Hedge Fund Intelligence supplies the EuroHedge and HSBC AsiaHedge series of equally weighted indices. The EuroHedge series consists of hedge funds that are at least 50 percent managed in developed European countries or that are solely invested in developed European countries. The series began in 2002. The HSBC AsiaHedge series contains hedge funds that are at least 50 percent managed in the Asia-Pacific area or that are solely invested in the Asia-Pacific area. The series began in 1998.

- **HedgeFund.net.** Also called the “Tuna” indices, covers more than 30 strategies. They are equally weighted indices based on the HedgeFund.net database.

- **HFR.** This company provides equally weighted hedge fund indices based on managers reporting to the HFR database of hedge fund returns segregated into a number of categories and subcategories. FOFs are not included in the composite index but are in a separate index. The indices were launched in 1994 with data beginning in 1990. Funds are assigned to categories based on the descriptions in their offering memoranda.

- **MSCI.** These indices are classified according to five basic categories and include a composite index. Within each category, indices are segregated on the basis of asset class and geographical region. Funds included need to have a minimum of US$15 million in AUM, although there is no restriction on whether a fund is open or closed. The indices are supported by a platform that allows subscribers to access the data at a more detailed level (industry focus, fund size, open versus closed, etc.). Indices are equally weighted except at higher levels of aggregation, where both equally weighted and asset-weighted versions are available.

A sample of available daily indices includes the following:

- **Dow Jones Hedge Fund Strategy benchmarks.** These benchmarks currently cover six hedge fund strategies. Funds within each category must meet asset size, years in existence, and statistically based style purity constraints. Funds that meet these restrictions are asked to participate in the index. However, only those managers who also agree to meet reporting constraints are included. The benchmarks were launched in 2001 as the Zurich Institutional Benchmark Series. The Dow Jones indices are available in an investable form through a separate asset company not directly affiliated with Dow Jones and are approximately equally weighted.

- **HFR hedge fund indices.** These indices are based on managers reporting to HFR. The indices cover a number of categories and subcategories and were launched in 2003.

- **MSCI Hedge Invest Index.** This index is based on over 100 hedge funds that represent 24 hedge fund strategies and have weekly liquidity. The MSCI Hedge Invest Index is available in an investable form through a separate asset company not directly affiliated with MSCI. The index was launched in July 2003.

- **Standard & Poor’s hedge fund indices.** These indices cover three styles with three strategies each. The indices are equally weighted and are rebalanced annually. Standard & Poor’s discloses the construction method and the number of funds that are in each strategy. It performs due diligence on all funds in the indices and publishes daily returns. The S&P Hedge Fund Indices are available in an investable form through a separate asset company not directly affiliated with Standard & Poor’s.

---

89As of April 6, 2004.
6.2.1.1. Comparison of Major Manager-Based Hedge Fund Indices

The general distinguishing feature of various hedge fund series is whether they report monthly or daily series, are investable or noninvestable, and list the actual funds used in benchmark construction. Of the current indices, only Dow Jones, Standard & Poor’s, MSCI, and HFR provide a daily return series. Of these daily indices, only Dow Jones and Standard & Poor’s publicly list the funds in the indices. Another important feature of the daily indices is that they are generally constructed from managed accounts of an asset manager rather than from the funds themselves.

For the monthly return series, the EACM Advisors, CISDM, HFR, and MSCI indices have many different classifications and subclassifications, whereas the Credit Suisse/Tremont and Standard & Poor’s have relatively few classifications. The CISDM indices do not report a “hedge fund composite” return each month.

It is natural to want to express the performance of hedge funds with a single number. However, defining the hedge fund universe is both a difficult and unproductive exercise. There is no general agreement among institutional investors regarding which investment strategies are considered hedge fund strategies and what weights should be given to each strategy.

There are many differences in the construction of the major manager-based hedge fund indices. Principal differences are as follows:

- **Selection criteria.** Decision rules determine which hedge funds are included in the index. Examples of selection criteria include length of track record, AUM, and restrictions on new investment. For example, MSCI, Dow Jones, and Standard & Poor’s have a specific rule-based processes for manager selection.
- **Style classification.** Indices have various approaches to how each hedge fund is assigned to a style-specific index and whether or not a fund that fails to satisfy the style classification methodology is excluded from the index.
- **Weighting scheme.** Indices have different schemes to determine how much weight a particular fund’s return is given in the index. Common weighting schemes are equally weighting and dollar weighting on the basis of AUM. Many indices report both equal-weighted and asset-weighted versions.
- **Rebalancing scheme.** Rebalancing rules determine when assets are reallocated among the funds in an equally weighted index. For example, some funds are rebalanced monthly; others use annual rebalancing.
- **Investability.** An index may be directly or only indirectly investable. The majority of monthly manager–based hedge fund indices are not investable, whereas most of the daily hedge fund indices are investable but often in association with other financial firms.

6.2.1.2. Alpha Determination and Absolute-Return Investing

Performance appraisal has emerged as a major issue in the hedge fund industry. Hedge funds have often been promoted as absolute-return vehicles. **Absolute-return vehicles** have been defined as investments that have no direct benchmark portfolios. Estimates of alpha, however, must be made relative to a benchmark portfolio. Problems in alpha determination have been discussed widely; for example, differences in the selected benchmark can result in large differences in reported alpha. One perspective is that all active management is about performance relative to a benchmark portfolio.

---

90 Alpha is defined as the return relative to an investment’s expected return given a benchmark portfolio and the investment’s beta with respect to the benchmark.

91 Refer to the reading on performance evaluation for the alpha determination in traditional investments; see Schneeweis (1998) for alpha determination in hedge funds.
to some investable benchmark. Another important issue in evaluating claims of alpha is whether account is being taken of all sources of systematic risk the fund may be exposed to. Alpha is the residual after returns to systematic risks have been removed. Simple models for systematic risk that have been applied to long-only equity portfolios may not be relevant for a hedge fund strategy.

The lack of a clear hedge fund benchmark, however, is not indicative of an inability to determine comparable returns for a hedge fund strategy. Hedge fund strategies within a particular style often trade similar assets with similar methodologies and are sensitive to similar market factors. Two principal means of establishing comparable portfolios are (1) using a single-factor or multifactor methodology and (2) using optimization to create tracking portfolios with similar risk and return characteristics. Kazemi and Schneeweis (2001) created passive indices, from both factors that underlie the strategy and financial instruments that are used in the strategy, to track the return of a hedge fund strategy. Their results indicate that active hedge fund management shows evidence of positive alpha relative to cited tracking portfolios.

### 6.2.2. Historical Performance

In this section, we provide summary information on the performance of various hedge fund strategies. Exhibit 8-22 shows the performance of a number of assets and combinations of assets (traditional assets and hedge funds) over the period 1990 to 2004. These assets include CSDIM’s Hedge Fund Composite Index and several measures of U.S. and global stock and bond performance.

For the entire period, the HFCI had the superior return performance relative to other traditional asset classes. During the sharp decline of the S&P 500 between mid 2000 and late 2002, the HFCI had a small but positive trend. The minimum monthly return for the HFCI for the entire period, at −6.92 percent, represents a smaller loss than that of the worst monthly return for either U.S. or world equities. The HFCI has a higher Sharpe ratio than any of the other reported assets. Note that the HFCI’s correlation of 0.59 with the S&P 500 is consistent with substantial long equity market exposure as well as the potential for risk-diversification benefits (because the correlation is considerably below 1).

As Exhibit 8-23 shows, for the five-year period ending in 2004, the HFCI outperformed U.S. and world equities but not bonds. The minimum monthly return for the HFCI during the period is smaller than for all other reported asset classes.

---

**EXHIBIT 8-22  Hedge Fund Performance, 1990–2004**

<table>
<thead>
<tr>
<th>Measure</th>
<th>HFCI</th>
<th>S&amp;P 500</th>
<th>Lehman Gov./Corp.</th>
<th>MSCI World</th>
<th>Lehman Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>13.46%</td>
<td>10.94%</td>
<td>7.77%</td>
<td>7.08%</td>
<td>8.09%</td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>5.71%</td>
<td>14.65%</td>
<td>4.46%</td>
<td>14.62%</td>
<td>5.23%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>1.61</td>
<td>0.45</td>
<td>0.78</td>
<td>0.19</td>
<td>0.73</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−6.92%</td>
<td>−14.46%</td>
<td>−4.19%</td>
<td>−13.32%</td>
<td>−3.66%</td>
</tr>
<tr>
<td>Correlation with HFCI</td>
<td>1.00</td>
<td>0.59</td>
<td>0.16</td>
<td>0.56</td>
<td>0.04</td>
</tr>
</tbody>
</table>

*Source: CISDM (2005c).*

---

92 See Waring and Siegel (2005).
93 The annual and monthly returns are presented in their nominal form. Annualized standard deviations are derived by multiplying the monthly data by the square root of 12.
EXHIBIT 8-23 Recent Hedge Fund Performance, 2000–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>HFCI</th>
<th>S&amp;P 500</th>
<th>Lehman Gov./Corp.</th>
<th>MSCI World</th>
<th>Lehman Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>6.84%</td>
<td>−2.30%</td>
<td>8.00%</td>
<td>−2.05%</td>
<td>8.51%</td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>4.83%</td>
<td>16.35%</td>
<td>4.76%</td>
<td>15.62%</td>
<td>6.00%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.86%</td>
<td>−0.31%</td>
<td>1.11</td>
<td>−0.30%</td>
<td>0.97</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−2.94%</td>
<td>−10.87%</td>
<td>−4.19%</td>
<td>−10.98%</td>
<td>−3.66%</td>
</tr>
<tr>
<td>Correlation with HFCI</td>
<td>1.00</td>
<td>0.52</td>
<td>0.11</td>
<td>0.60</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Source: CISDM (2005c).


<table>
<thead>
<tr>
<th>Strategy or Index</th>
<th>Annual Return</th>
<th>Annual Standard Deviation</th>
<th>Sharpe Ratio</th>
<th>Minimum Monthly Return</th>
<th>Correlation w/S&amp;P 500</th>
<th>Correlation w/Lehman Gov./Corp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFCI</td>
<td>13.46%</td>
<td>5.71%</td>
<td>1.61</td>
<td>−6.92%</td>
<td>0.59</td>
<td>0.17</td>
</tr>
<tr>
<td>Event driven</td>
<td>13.46%</td>
<td>5.59%</td>
<td>1.64</td>
<td>−9.37%</td>
<td>0.59</td>
<td>0.07</td>
</tr>
<tr>
<td>Equity hedge</td>
<td>15.90%</td>
<td>9.34%</td>
<td>1.24</td>
<td>−9.70%</td>
<td>0.64</td>
<td>0.10</td>
</tr>
<tr>
<td>Equity market neutral</td>
<td>9.24%</td>
<td>2.50%</td>
<td>1.98</td>
<td>−1.07%</td>
<td>0.09</td>
<td>0.24</td>
</tr>
<tr>
<td>Merger/risk arbitrage</td>
<td>9.07%</td>
<td>4.86%</td>
<td>0.99</td>
<td>−8.78%</td>
<td>0.48</td>
<td>0.10</td>
</tr>
<tr>
<td>Distressed securities</td>
<td>15.28%</td>
<td>6.07%</td>
<td>1.81</td>
<td>−9.71%</td>
<td>0.42</td>
<td>0.04</td>
</tr>
<tr>
<td>Fixed-income arbitrage</td>
<td>7.62%</td>
<td>3.61%</td>
<td>0.92</td>
<td>−6.61%</td>
<td>0.06</td>
<td>−0.06</td>
</tr>
<tr>
<td>Convertible arbitrage</td>
<td>10.23%</td>
<td>3.96%</td>
<td>1.50</td>
<td>−3.42%</td>
<td>0.19</td>
<td>0.13</td>
</tr>
<tr>
<td>Global macro</td>
<td>16.98%</td>
<td>8.38%</td>
<td>1.51</td>
<td>−5.41%</td>
<td>0.26</td>
<td>0.34</td>
</tr>
<tr>
<td>Short selling</td>
<td>−0.61%</td>
<td>19.39%</td>
<td>−0.25</td>
<td>−14.62%</td>
<td>−0.76</td>
<td>−0.01</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>10.94%</td>
<td>16.65%</td>
<td>0.45</td>
<td>−14.46%</td>
<td>1.00</td>
<td>0.13</td>
</tr>
<tr>
<td>Lehman Gov./Corp.</td>
<td>7.77%</td>
<td>4.46%</td>
<td>0.78</td>
<td>−4.19%</td>
<td>0.13</td>
<td>1.00</td>
</tr>
<tr>
<td>MSCI World</td>
<td>7.08%</td>
<td>14.62%</td>
<td>0.19</td>
<td>−13.32%</td>
<td>0.86</td>
<td>0.09</td>
</tr>
<tr>
<td>Lehman Global</td>
<td>8.09%</td>
<td>5.23%</td>
<td>0.73</td>
<td>−3.66%</td>
<td>0.11</td>
<td>0.74</td>
</tr>
</tbody>
</table>

Source: CISDM (2005c).

The risk-and-return benefit of a wide range of hedge fund indices and their correlations with stock and bond indices are given in Exhibit 8-24. As the dispersion of Sharpe ratios and of correlations of hedge fund styles with stocks and bonds in Exhibit 8-24 shows, in 1990 to 2004, there was considerable variation in the risk and return characteristics among styles. As expected, those hedge fund groups whose strategies call for eliminating stock or bond market risk (e.g., equity market neutral or fixed-income arbitrage) have low correlations with, respectively, stock or bond indices. Those hedge fund strategies with equity exposure (e.g., event driven and hedged equity) have moderate correlations with the S&P 500.

Research has shown that the actual performance of hedge fund strategies depends on the market conditions affecting that strategy. As shown in Exhibit 8-25, equity-based hedge fund strategies are correlated with several equity and bond market factors. Credit-sensitive strategies (e.g., distressed securities) are correlated with similar factors (e.g., high-yield debt returns) as credit-sensitive bond instruments. Because relative-value strategies (e.g., equity market neutral) and systematic managed futures strategies (which are discussed in detail later) are sensitive to different return factors from those to which hedged equity strategies and the
### EXHIBIT 8-25  Factor Correlations, 1990–2004

<table>
<thead>
<tr>
<th>Hedge Fund</th>
<th>S&amp;P 500</th>
<th>Lehman Gov/Corp.</th>
<th>Lehman Corp. High Yield</th>
<th>Stock Volatility</th>
<th>Bond Volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFCI</td>
<td>0.59</td>
<td>0.17</td>
<td>0.51</td>
<td>−0.42</td>
<td>−0.13</td>
</tr>
<tr>
<td>Event driven</td>
<td>0.59</td>
<td>0.07</td>
<td>0.69</td>
<td>−0.42</td>
<td>−0.02</td>
</tr>
<tr>
<td>Equity hedge</td>
<td>0.64</td>
<td>0.10</td>
<td>0.43</td>
<td>−0.33</td>
<td>−0.04</td>
</tr>
<tr>
<td>Equity market neutral</td>
<td>0.09</td>
<td>0.24</td>
<td>−0.03</td>
<td>−0.13</td>
<td>−0.23</td>
</tr>
<tr>
<td>Merger/risk arbitrage</td>
<td>0.48</td>
<td>0.10</td>
<td>0.50</td>
<td>−0.31</td>
<td>−0.01</td>
</tr>
<tr>
<td>Distressed securities</td>
<td>0.42</td>
<td>0.04</td>
<td>0.70</td>
<td>−0.41</td>
<td>−0.01</td>
</tr>
<tr>
<td>Fixed-income arbitrage</td>
<td>0.06</td>
<td>−0.06</td>
<td>0.34</td>
<td>−0.36</td>
<td>−0.18</td>
</tr>
<tr>
<td>Convertible arbitrage</td>
<td>0.19</td>
<td>0.13</td>
<td>0.47</td>
<td>−0.12</td>
<td>−0.15</td>
</tr>
<tr>
<td>Global macro</td>
<td>0.26</td>
<td>0.34</td>
<td>0.23</td>
<td>−0.27</td>
<td>−0.26</td>
</tr>
<tr>
<td>Short selling</td>
<td>−0.78</td>
<td>−0.01</td>
<td>−0.50</td>
<td>0.20</td>
<td>−0.15</td>
</tr>
</tbody>
</table>

*Notes: Stock and bond volatility was measured as, respectively, monthly volatility of daily returns of the S&P 500 and Lehman Brothers bond index.

*Source: CISDM (2005c).*

540 Managing Investment Portfolios

S&P 500 are sensitive, one expects them to have low correlations with the S&P 500 and they may be considered risk diversifiers. Because equity hedge funds load on similar return factors as the S&P 500, they offer less diversification than many relative-value strategies and can be more rightly considered return enhancers.

The different sensitivities of various hedge fund strategies to various market factors result in different correlations among hedge fund strategies themselves. The correlations between various hedge fund strategies are given in Exhibit 8-26. Diversification among hedge fund strategies should therefore also reduce the volatility of hedge fund–based investment portfolios.

6.2.3. Interpretation Issues

Hedge fund indices often have meaningfully different performance within a given time period. This raises the challenging question of which index is most appropriate for the investor’s purposes.

Despite the differences in returns, comparable hedge fund indices appear to be sensitive to the same set of risk factors. The return differences among indices often reflect differences in the weights of different strategy groups.

The hedge fund investor should be aware of the following issues in selecting and using hedge fund indices.

#### 6.2.3.1. Biases in Index Creation

The use of manager-based hedge fund indices in performance appraisal and asset allocation is based on the premise that the indices neutrally reflect the underlying performance of the strategy. A primary concern is that most databases are self-reported; that is, the hedge fund manager chooses which databases to report to and provides the return data. Although the correlations among hedge fund indices based on similar

---

94Although some research (Schneeweis and Pescatore, 1999) has focused on CTAs as offering exposure to long volatility, unless specifically designed to capture volatility, systematic CTA strategies often make returns in periods of low-volatility in high-trend markets. Systematic commodity trading programs (e.g., CTAs) are positively correlated with various passive trend-following indices. See CISDM (2005d) and www.cisdm.som.umass.edu for information.

95Discussion in this section draws on Schneeweis, Kazemi, and Martin (2002).
### EXHIBIT 8-26 Correlations between Hedge Fund Strategies, 1990–2004

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HFCI</td>
<td>1.00</td>
<td>0.76</td>
<td>0.90</td>
<td>0.32</td>
<td>0.52</td>
<td>0.66</td>
<td>0.38</td>
<td>0.47</td>
<td>0.72</td>
<td>-0.64</td>
<td>-0.59</td>
<td>0.56</td>
<td>0.05</td>
</tr>
<tr>
<td>Event driven</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity hedge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity market neutral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merger/Risk arbitrage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distressed securities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed-income arbitrage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convert. arbitrage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global macro</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short selling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lehman Gov./Corp.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: CISDM (2005c).
strategies are generally moderately high in the period covered by Exhibit 8-26 (e.g., above 0.80), in certain cases, the correlations fall below 0.20. There are several possible explanations for low correlations between “similar strategy” indices. One is the size and age restrictions some indices impose. Another may be the weighting schemes.

Value weighting may result in a particular index taking on the return characteristics of the best-performing hedge funds in a particular time period: As top-performing funds grow from new inflows and high returns and poorly performing funds are closed, the top-performing funds represent an increasing share of the index. Fung and Hsieh (2001) pointed out that the indices that are value weighted may reflect current popularity with investors because the asset values of the various funds change as a result of asset purchases and price. Popularity may reflect the most recent results, creating a momentum effect in returns. The ability of an investor to track an index subject to momentum is problematic.

Equal-weighted indices may reflect potential diversification of hedge funds better than value-weighted indices. For funds designed to track equal-weighted indices, however, the costs of rebalancing to index weights make it difficult to create an investable form. Only recently have hedge fund indices been created that are investable. Some such indices have the express goal of tracking a comparable but noninvestable index. The creation of a single, all-encompassing hedge fund index that reflects some natural, market-based equilibrium assumption as to the proper holdings of hedge funds and is appropriate for all purposes does not appear to be feasible. Many hedge fund investors use custom or negotiated benchmarks.

An appropriate benchmark reflects the particular style of an investment manager and can serve as a surrogate for the manager in studies of risk and return performance and asset allocation. Of great concern for investors is whether an index reflects the actual relative sensitivity of hedge funds to various market conditions, such that each index provides information on the true diversification benefits of the underlying hedge fund strategies. Many studies have used both single-factor and multifactor models in identifying market factors and option-like payoffs that describe the sources of hedge fund returns. However, the sensitivity of various hedge fund indices to these economic factors may change over time, so the changing styles and changing assets under management (if asset-weighted) in an index may make historical results relative to that index conditional at best.

6.2.3.2. Relevance of Past Data on Performance

The usefulness of historical hedge fund data is a topic of controversy. As is true for stock and bond analyses, hedge funds with similar investment styles generate similar returns, and there is little evidence of superior individual manager skill within a particular style group. Research has also shown that the volatility of returns is more persistent through time than the level of returns. This research shows that the best forecast of future returns is one that is consistent with prior volatility, not one that is consistent with prior returns. There are a host of methodological concerns, however, with interpreting the results of such studies.

97See Fung and Hsieh (1997a) and Schneeweis and Pescatore (1999).
98See Bodie, Kane, and Marcus (2005) for a summary. To the degree that superior return persistence is shown, the result arises primarily from consistency among poor performers rather than superior performers; see Brown et al. (1999).
100The ability of historical data to classify managers into similar trading strategies is still an open question. Fung and Hsieh (1997a) and others have used various factor analytic programs to group managers. In contrast, various fund management companies place managers into relevant groups on the
Chapter 8  Alternative Investments Portfolio Management

543

The composition of hedge fund indices also changes greatly, so the past returns of an index reflect the performance of a different set of managers from today’s or tomorrow’s managers. This may be a more severe problem for value-weighted indices than for equal-weighted indices because value-weighted indices are more heavily weighted in the recent best-performing fund(s).

6.2.3.3. Survivorship Bias  Survivorship bias is often raised as a major concern for investors in hedge funds. Survivorship bias results when managers with poor track records exit the business and are dropped from the database whereas managers with good records remain. If survivorship bias is large, then the historical return record of the average surviving manager is higher than the average return of all managers over the test period. Because a diversified portfolio would have likely consisted of funds that were destined to fail as well as funds destined to succeed, studying only survivors results in overestimation of historical returns. It is estimated that this bias is in the range of at least 1.5 to 3 percent per year.101

Survivorship bias varies among hedge fund strategies. For instance, survivorship bias is minor for event-driven strategies, is higher for hedged equity, and is considerable for currency funds. More importantly, for the largest hedge fund group, equity hedge funds, overestimation of historical performance because of survivorship bias has been previously reported to range from 1.5 percent to 2 percent. However, the bias may be concentrated in certain periods (e.g., following the August 1998 Long-Term Capital Management crisis). Thus, the levels of survivorship bias exhibited in past data may, depending on economic conditions and strategy, over- or underestimate future bias. Finally, data for U.S. equity hedge funds indicate that for particular hedge fund strategies, although the relative return performance of the “dead” funds was less than that of the “alive” funds, the survivorship bias may differ greatly among funds, with some nonsurvivor funds showing no return bias.

Moreover, the problem of survivorship bias may be reduced by conducting superior due diligence. For instance, one explanation for the proliferation of FOFs is that managers of these funds may be able to avoid managers destined to fail, thereby mitigating the survivorship bias problem. Investors may be willing to bear an additional layer of management fees to reduce exposure to the ill-fated managers. As a result, once the FOFs have screened funds, survivorship bias may be reduced significantly.

6.2.3.4. Stale Price Bias  In asset markets, lack of security trading may lead to what is called stale price bias. For securities with stale prices, measured correlations may be lower than expected, and depending on the time period chosen, measured standard deviation may be higher or lower than would exist if actual prices existed.

Even in traditional asset markets, prices are often computed from factor models, appraisal values, and so on, so that reported prices do not reflect current market prices. In fact, for CTAs and many hedge fund strategies, prices reflect market-traded prices to a greater extent than in many traditional asset portfolios. There is little evidence that stale prices present a significant bias in hedge fund returns.

6.2.3.5. Backfill Bias (Inclusion Bias)  Backfill bias can result when missing past return data for a component of an index are filled at the discretion of the component (e.g., a hedge

basis of direct evaluation. Future research is required to see which of the relevant methods provides the least bias.

101See Brown et al. (1999) and Fung and Hsieh (2000).
fund for a hedge fund index) when it joins the index. As with survivorship bias, backfill bias makes results look too good because only components with good past results will be motivated to supply them.\textsuperscript{102} The issue of this bias has been raised particularly with respect to certain hedge fund indices.\textsuperscript{103}

\textbf{EXAMPLE 8-10 Hedge Fund Benchmarks}

CBA, a large charitable organization, is planning to make an investment in one or more hedge funds. Alex Carr, CIO of CBA, is evaluating information prepared by the organization’s senior analyst, Kim Park, CFA.

Carr asks Park why a U.S.-focused market-neutral long–short hedge fund CBA is considering has resisted accepting a U.S equity index as a benchmark.

1. Prepare a response to Carr’s question to Park.
2. Recommend an alternative to using a stock index benchmark for a market-neutral long–short fund.
3. Discuss the impact the following factors have on index creation with respect to hedge funds:
   a. Survivorship bias
   b. Value-weighted indices
   c. Stale price bias

\textit{Solution to Problem 1}: Market-neutral long–short hedge funds consider themselves to be absolute return vehicles, in that their performance should not be linked to that of the stock market. Such a fund should have effectively zero systematic risk.

\textit{Solution to Problem 2}: For those hedge funds using absolute-return strategies that are indifferent to the direction of the market, a hurdle rate may be used as a standard for performance.

\textit{Solution to Problem 3}:

a. Survivorship bias occurs when returns of managers who have failed or exited the market are not included in the data analyzed over a specific timeframe. This results in overestimation of historical returns in the range of 1.5 to 3.0 percent per year. The timing of survivorship bias may be concentrated during certain economic periods, which further complicates analysis of persistence of returns over shorter timeframes. A manager’s investment performance reflects not only skill but the starting point of market opportunities and valuations levels—such factors constitute age effects (or vintage effects) in hedge fund performance. Over a long

\textsuperscript{102}See Malkiel and Saha (2005) and references therein. Another bias the authors identified is end-of-life bias, which arises from the option a hedge fund has to stop reporting results. One might anticipate that predominantly poorly performing hedge funds would choose to do that.

\textsuperscript{103}See Malkiel and Saha (2005).
horizon, the starting point should generally decrease in importance. However, hedge funds have average track records of only two to five years. Age effects make it difficult to compare the performance of hedge funds that have track records of different lengths.

b. Indices that are value weighted, as opposed to equally weighted, may take on the return characteristics of the best-performing hedge fund over a given period. These indices thus reflect the weights of popular bets by hedge fund managers, because the asset values of the various funds change as a result of asset purchases as well as price appreciation.

c. Lack of security trading leads to stale prices for those securities and can cause measured standard deviation to be over- or understated, depending on the time period being studied. This could result in measured correlations being lower than expected. This issue is not a significant concern in the creation of hedge fund indices because monthly data are used and for many hedge fund strategies, the underlying holdings are relatively liquid, so positions reflect market-traded prices.

6.3. Hedge Funds: Investment Characteristics and Roles

Hedge funds have been described as skill-based investment strategies. Skill-based investment strategies obtain returns primarily from the firm’s competitive advantages in information or its interpretation. To the extent that a hedge fund’s returns derive primarily from an individual manager’s skill or superior depth of information, its returns may be uncorrelated or weakly correlated with the long-term return of the traditional stock and bond markets.

The investor needs to keep in mind, however, that the flip side of skill in producing investment success is market opportunity. The supply of market opportunities can and does vary for particular investment strategies as investment industry, economic, and financial market conditions evolve. To take an obvious example, the opportunities for merger arbitrage hedge funds are heavily influenced by corporate merger activities.

6.3.1. Investment Characteristics

A number of empirical studies have directly assessed the return drivers of traditional and alternative investments. For instance, for traditional stocks and bonds, a common set of factors has been used to explain stock and bond returns.\textsuperscript{104} Similarly, academic research indicates that for hedge funds, a common set of return drivers based on trading strategy factors (e.g., option-like payoffs) and location factors (e.g., payoffs from a buy-and-hold policy) help to explain returns of each strategy.\textsuperscript{105}

Results show that, as for traditional “long-bias” stock and bond investments, the returns of some long-bias equity-based and fixed income–based hedge fund strategies are affected primarily by changes in the risk and return of the underlying stock and bond markets and should, therefore, be regarded less as portfolio return diversifiers than as portfolio return enhancers. Hedge fund strategies that attempt to be less affected by the direction of the underlying stock and bond markets (e.g., equity market neutral or bond arbitrage) may be regarded more as diversifiers for traditional stock and bond portfolios.

\textsuperscript{104}See Fama and French (1996).

\textsuperscript{105}See Fung and Hsieh (1997a), Schneeweis and Spurgin (1998), Schneeweis and Pescatore (1999), and Agarwal and Naik (2000).
Studies that used direct replication of underlying strategies also support market factors and option-like payoff variables (e.g., put options) as describing certain hedge fund strategies.\textsuperscript{106} The bottom line is that analysis of the underlying factors used in trading strategies is important, given the investor’s economic forecast and market expectations, when deciding which hedge funds to include in a portfolio. Investors may consider allocation to various strategies warranted by economic factors directly driving hedge fund returns and may even consider allocations to new strategies based on new economic conditions driving hedge fund returns.

6.3.2. Roles in the Portfolio\textsuperscript{107} Hedge funds constitute a diverse set of strategies. Because the strategies are skill based, most investors will accord manager selection great scrutiny. Investors put varying emphases on style selection. For a given portfolio, the diversification benefits of adding hedge funds in different style groups can be quite distinct.

FOF investments have been popular as entry-level investments because they essentially delegate individual manager selection to the FOF manager and provide professional management. They also shorten the due diligence process to a single manager. FOFs may be diversified funds composed of various hedge fund strategies or style pure. A significant consideration is that FOF investing involves two layers of management and incentive fees.

Research indicates that an equally weighted diversified portfolio of five to seven randomly selected equity securities will result in a portfolio standard deviation similar to that of the investment population from which it is drawn. Similarly, for hedge funds, a randomly selected equal-weighted portfolio of five to seven hedge funds has a standard deviation similar to that of the population from which it is drawn.\textsuperscript{108} Thus, as is true for equity portfolios, multimanager hedge fund portfolios may have risk levels similar to that of a larger population of hedge funds. Also important is that a portfolio of randomly selected hedge funds has a correlation in excess of 0.90 with that of a typical hedge fund benchmark. Therefore, the use of a smaller subset of hedge funds can represent the performance of the EACM 100, just as a smaller portfolio of stocks or mutual funds can represent, respectively, the performance of the S&P 500 or mutual fund indices.

6.3.2.1. The Role of Hedge Funds as Diversifiers A first caution is that, as discussed in detail in the chapter on asset allocation, the allocations produced by mean–variance optimization (MVO) are sensitive to errors in return estimates. The different historical index returns among various index providers raise a warning that basing allocations on historical hedge fund index returns in MVO may be unreliable.\textsuperscript{109} Hedge fund strategies often have option characteristics that present a further challenge when relying on MVO.

The use of hedge fund indices in overall asset allocation is based, in part, on the assumption that FOFs created to track certain hedge fund strategies perform similarly to the benchmarks used in asset allocation analysis. In short, there are a number of issues involved in portfolio creation at the strategy level as well as among strategies. These issues include (1) persistence in historical performance, (2) portfolio rebalancing, and (3) impact of return distribution features beyond mean and standard deviation—that is, “higher moments.”

\textsuperscript{106}See Mitchell and Pulvino (2000).
\textsuperscript{107}Discussion in this section draws on CISDM (2005c).
\textsuperscript{109}It is important to note that use of historical returns in optimization modeling may not reflect expected risk and return relationships. If factor-based regression models are used to forecast expected rates of return, then the consistency of the sensitivities of various index models to factors is an issue of concern.
EXHIBIT 8-27  Hedge Fund Performance in Portfolios, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>Portfolio I</th>
<th>Portfolio II</th>
<th>Portfolio III</th>
<th>Portfolio IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>9.64%</td>
<td>10.43%</td>
<td>7.86%</td>
<td>9.01%</td>
</tr>
<tr>
<td>Annualized std. dev</td>
<td>7.94%</td>
<td>7.09%</td>
<td>8.29%</td>
<td>7.28%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.67</td>
<td>0.87</td>
<td>0.43</td>
<td>0.65</td>
</tr>
<tr>
<td>Minimum Monthly Return</td>
<td>−6.25%</td>
<td>−6.39%</td>
<td>−5.61%</td>
<td>−5.87%</td>
</tr>
<tr>
<td>Correlation w/HFCI</td>
<td>0.59</td>
<td>0.69</td>
<td>0.51</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Notes:
Portfolio I: 50 percent S&P 500, 50 percent Lehman Gov./Corp. Bond.
Portfolio II: 40 percent S&P 500, 40 percent Lehman Gov./Corp., 20 percent HFCI.
Portfolio III: 50 percent MSCI World, 50 percent Lehman Global Bond.
Portfolio IV: 40 percent MSCI World, 40 percent Lehman Global, 20 percent HFCI.
Source: CISDM (2005c).

EXHIBIT 8-28  Recent Hedge Fund Performance in Portfolios, 2000–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>Portfolio I</th>
<th>Portfolio II</th>
<th>Portfolio III</th>
<th>Portfolio IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>3.15%</td>
<td>3.92%</td>
<td>3.45%</td>
<td>4.16%</td>
</tr>
<tr>
<td>Annualized std. dev</td>
<td>7.93%</td>
<td>6.94%</td>
<td>8.55%</td>
<td>7.48%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.06</td>
<td>0.18</td>
<td>0.09</td>
<td>0.19</td>
</tr>
<tr>
<td>Minimum Monthly Return</td>
<td>−4.36%</td>
<td>−3.62%</td>
<td>−4.94%</td>
<td>−4.08%</td>
</tr>
<tr>
<td>Correlation w/HFCI</td>
<td>0.57</td>
<td>0.66</td>
<td>0.62</td>
<td>0.70</td>
</tr>
</tbody>
</table>

Notes:
Portfolio I: 50 percent S&P 500, 50 percent Lehman Gov./Corp. Bond.
Portfolio II: 40 percent S&P 500, 40 percent Lehman Gov./Corp Bond, 20 percent HFCI.
Portfolio III: 50 percent MSCI World, 50 percent Lehman Global Bond.
Portfolio IV: 40 percent MSCI World, 40 percent Lehman Global, 20 percent HFCI.
Source: CISDM (2005c).

If one assumes that a portfolio tracks the performance of a particular index, then an investor may use hedge fund indices together with other traditional indices to improve risk–return trade-offs.

6.3.2.2. Historical Performance  The benefit of including hedge funds in diversified portfolios is illustrated in Exhibit 8-27. For the 1990 to 2004 period, when the HFCI is added to U.S. stocks, bonds, or a portfolio of U.S. stocks and bonds, the risk-adjusted return improves. For instance, the Sharpe ratio of a balanced portfolio with U.S. stocks and bonds (0.67, Portfolio I) increases to 0.87 when hedge funds are added (Portfolio II). Similarly, when hedge funds are added to a balanced portfolio of world equities and bonds (Portfolio III), the Sharpe ratio increases significantly from 0.43 to 0.65 (Portfolio IV). The correlation between the HFCI and the U.S. stock/bond portfolio (Portfolio I) is 0.59 and between the HFCI and the world stock/bond portfolio (Portfolio III) is 0.51.

Hedge funds achieved historically high returns in the first half of the 1990s, which suggests that the more recent record should be examined closely. Exhibit 8-28 considers the period 2000 to 2004. The annualized return of hedge funds for this period (6.84 percent, Exhibit 8-23) is lower than for the 1990 to 2004 period (13.46 percent, Exhibit 8-22), but the...
benefits that hedge funds add to the portfolios are similar to those for the period that includes the early 1990s.

In interpreting data such as those in Exhibit 8-28 showing that the inclusion of hedge funds effected a mean–variance improvement, researchers such as Kat and Amin (2003) have shown that including hedge funds can also frequently lead to lower skewness and higher kurtosis, which are exactly opposite to the attributes (positive skewness and moderate kurtosis) that investors are presumed to want.

---

**EXAMPLE 8-11  Skewness and Hedge Funds**

In 2002, the S&P 500 dropped by more than 20 percent and distressed debt hedge funds as a group achieved poor returns. Equity market-neutral funds also achieved poor returns, which was explained as relating to lower market liquidity.

1. Explain why distressed debt hedge funds might have performed poorly in 2002.
2. Explain how lower market liquidity might have negatively affected long–short market-neutral hedge funds.

_Solution to Problem 1:_ Major declines in equity markets lead to widening credit spreads and, all else being equal, to capital losses on high-yield bonds. Distressed debt hedge funds are exposed to the risk of increased credit spreads and, as a result, fared poorly in 2002.

_Solution to Problem 2:_ Maintaining market neutrality involves dynamic portfolio adjustments. Declines in market liquidity increase the cost of shorting equity markets.

---

The following are techniques for neutralizing negative skewness in a portfolio resulting from hedge fund positions that a portfolio manager may consider:

- Adopt a mean–variance, skewness and kurtosis–aware approach to hedge fund selection. An example is given in Kat (2005), who discussed combining global macro and equity market-neutral hedge strategies with traditional assets. Global macro funds have tended to have positive skewness with only moderate correlation with equities but relatively high kurtosis and volatility; equity market-neutral strategies tend to act as volatility and kurtosis reducers in the portfolio. In other words, smart hedge fund selection may be able to reduce the problem of negative skewness.

- Invest in managed futures. Managed futures programs are generally trend following in nature, which tends to produce skewness characteristics that are opposite to those of many hedge funds.

**6.3.3. Other Issues**

In addition to market factors affecting a broad range of investment vehicles, individual fund factors may affect expected performance. Academic and practitioner

---

110 This discussion draws on Kat (2005), who also discussed a program of buying and rolling over out-of-the-money stock index put options, which tend to deliver positively skewed returns.
111 This discussion is based on Kat (2005).
112 Discussion in this section draws on Schneeweis, Kazemi, and Martin (2002).
research has tested various fund-specific factors—such as onshore/offshore, age, and size—on manager performance. Results from this research support the following: (1) Young funds outperform old funds on a total-return basis, or at least old funds do not outperform young ones; (2) on average, large funds underperform small funds; (3) FOFs may provide closer approximation to return estimation than indices do.\textsuperscript{113}

Unfortunately, as in any tests of fund effects, one has the problem of disaggregating effects for a large number of funds, each with different strategies, starting periods, and so on. In fact, although it is not the purpose of this chapter to conduct a detailed analysis of each of these effects, the following discussion indicates that simple relationships between hedge fund returns and each of the aforementioned fund factors must be analyzed closely before final conclusions can be made.

- **Performance fees and lock-up impacts.** Periods of severe drawdown (e.g., 1998) may influence funds to dissolve rather than face the prospect of not earning the incentive fees because of HWM provisions. There is some evidence of an impact of lock-up periods on hedge fund performance. In the case of U.S. hedge funds, funds with quarterly lock-ups have higher returns than similar-strategy funds with monthly lock-ups.

- **Funds of funds.** FOF returns may differ from overall hedge fund performance because of various issues, including a less direct impact of survivorship bias on FOFs because hedge funds that dissolve are included in the returns of the FOFs (there still is some survivorship bias, in that FOFs may remove themselves from datasets because of, for example, poor performance). FOFs may thus provide a more accurate prediction of future fund returns than that provided by the more generic indices.

  However, classification and style drift are issues with FOFs. A number of FOFs reported as diversified by category differ greatly not only in their correlation with standard indices but also in their sensitivity to general economic factors. Investors must use factors to test “style drift” of generic FOFs.

  As a result, the use of FOFs that change over time in response to rebalancing may not fit well into strict asset allocation modeling. For instance, new FOFs (U.S. diversified FOFs) starting in the years 1992 onward were found to have lower correlations with FOFs starting in 1991 or earlier, but as years progressed, the correlations increased. This indicates that new FOFs are constructed differently from old funds. This is expected. New FOFs can be more flexible in fund selection. As time passes, however, older FOFs can redistribute cash or funds in such a way that they resemble the new fund construction. Thus, simple averaging across FOFs without taking the year of origination into account may not be appropriate.

  Over time, hedge fund correlations with hedged equity have risen and hedge fund correlations with global macro strategies have fallen, indicating an increase in FOFs’ use of hedged equity and a decrease in the use of global macro. These results emphasize that FOFs may be timing one market and have become less useful in asset allocation strategies than previously because of their factor sensitivity and composition change—in contrast to more style-pure hedge fund indices or strategies.

- **Effect of fund size.** On the one hand, there are potential advantages to a hedge fund having a large asset base. The fund may be able to attract and retain more talented people than a small fund and receive more attention from, for example, its prime broker. On the other hand, a smaller fund may be more nimble. With smaller positions, the market impact cost

\textsuperscript{113}See Howell (2001), Liang (2000), and Fung and Hsieh (2002).
of its trades may be less. Depending on the particular strategies pursued, there may be an
optimal market size for the fund in relation to market opportunities available for its strategy
at a given time. The investor should, following the paradigm for due diligence illustrated
in Example 8-2, examine the current market opportunities in relation to the fund’s size.

Research has generally supported the conclusion that, overall, larger funds have earned
lower mean returns and lower risk-adjusted returns than small funds. However, the
relationships of performance to fund size have been found to have exceptions according
to hedge fund strategy. Because market opportunities and assets under management in a
strategy change, the best advice may be to evaluate the effect of fund size on a case-by-case
basis. The investor should also investigate differences in mortality rates among hedge funds
by size within the strategy.

- *Age (vintage) effects.* The usual performance statistics hide the time dimension behind
hedge fund performance. Investors should be sensitive to the fact that because of vintage
effects, it may be difficult to compare the performance of funds with different lengths of
track record. Comparisons of a fund with the performance of the median manager of the
same vintage in a hedge fund’s style group can be revealing.

### 6.3.3.1. Hedge Fund Due Diligence

Hedge funds have historically been loosely regulated entities without the mandated and often standardized disclosure requirements of other investment vehicles, such as unit trusts in the United Kingdom and mutual funds in the United States. Although hedge funds typically provide an annual audited financial statement and performance review, they rarely disclose their existing portfolio positions. Possible concerns that arise from this lack of disclosure (see Anson, 2002a) include the following:

- Authenticity of the hedge fund manager’s performance is doubtful if investors cannot verify the performance with a position report.
- Risk monitoring and management are difficult for investors without disclosure of trading and portfolio positions by the hedge fund manager. Without full disclosure of the holdings, investors cannot aggregate risk across their entire investment program to understand the implications at the portfolio level.

Because hedge fund operations and/or strategies may also be somewhat opaque, reducing investment risk in hedge fund investing starts with due diligence.

Again, the framework for due diligence presented in Example 8-2—covering market opportunity, investment process, organization, people, terms and structure, service providers, documents, and write-ups—applies here. The investor may interview the hedge fund and/or submit a questionnaire. The Alternative Investments Management Association provides the following due diligence checklist as a guide for investors evaluating hedge fund managers.114 Investors should try to learn the following information:

1. **Structure of the Hedge Fund**
   a. Legal entity: type and ownership structure
   b. Name and address of hedge fund manager
   c. Domicile: onshore or offshore
      i. Branch offices or other locations (and their functions)

114See www.aima.org.
d. Regulatory registrations (e.g., investment adviser or commodity trading adviser)
e. Personnel: responsible officers and employees (including their biographies)
f. Auditors, legal counsel, and prime broker information

II. Strategy of the Hedge Fund
a. Style (e.g., event driven, global macro)
b. Instruments used under each strategy (e.g., which derivatives)
c. Benchmark, hurdle rate, high-water mark, etc.
d. Competitive niche or any uniqueness about the fund
   i. The source of investment ideas or strategy
   ii. How the strategy works under different market conditions
   iii. Market conditions in which the strategy works best
   iv. Any capacity constraint for the strategy
e. Current investments: types and positions

III. Performance Data
a. List of all funds and performance since inception.
b. Information on the performance of the funds and explanations

IV. Risk
a. What and how risks are measured and managed
   i. Personnel involved
b. Specific risk-control measures, if any (e.g., position limits, derivatives, counterparty credit limits)
c. Past, current, and future use of leverage

V. Research
a. Any change in strategy in the past resulting from research findings
b. Efforts put into research for investment/trading ideas
c. Budget and personnel (internal and external) for research

VI. Administration
a. Law suits, litigations, regulatory actions against the fund or its managers
b. Significant employees and employee turnover
c. Personnel arrangement for the account: responsible account executive
d. Disaster recovery plan

VII. Legal
a. Fee structure: management and incentive fees (Is high-water mark applicable?)
b. Lock-up
c. Subscription amount: maximum and minimum
d. Drawback provision

VIII. References
a. Professional: auditor, prime broker, legal counsel
b. Existing investors
EXAMPLE 8-12 An Investor Does Due Diligence on a Hedge Fund

Alois Winkelmann is conducting due diligence on a U.S.-based hedge fund, Tricontinent Investors, for the Malvey Charitable Trust (MCT). Among the facts Winkelmann gathers are the following:

*Structure:* The fund employs three people—the two principals, Bryce Smith and Henrietta Duff, and an administrative assistant. Smith’s prior work experience is 10 years as an equity analyst at North Country Trust Company and, prior to that, three years as an associate in a Syracuse, New York, law firm. He holds a BBA and an LLB. Duff worked for three years as an equity growth fund manager at a medium-size mutual fund complex. Prior to that, she was a corporate finance associate at a leading investment bank. Duff holds an AB in English and an MBA with a concentration in finance. The principals have at-will employment contracts. The fund’s relationship with its prime broker extends back two years. The fund has used only one prime broker since it was formed. The prime broker is a prestigious firm ranked number two by prime brokerage business.

*Hedge Fund Strategy:*
- The fund invests in both fixed-income and equity markets.
- The fund buys U.S. 10-year Treasury notes and borrows short term abroad in markets that have particularly low interest rates to earn, currently, a positive spread.
- The fund conducts merger arbitrage involving the securities of the target and acquirer.

*Legal:* The fund has a 1 and 20 fee structure and a two-year lock-up period.

Based only on the information supplied, identify and discuss the risk factors in this hedge fund investment.

*Solution:*
- The firm is a small shop with limited management and research resources.
- Either principal could leave the firm on short notice because of the at-will nature of their employment contracts.
- The hedge fund has only a two-year track record available for evaluation.
- Neither principal has prior experience in either fixed-income investing or merger arbitrage, although Duff’s investment banking experience may be somewhat relevant.
- The fixed-income strategy could become unprofitable if the U.S. dollar weakens against the currencies of the markets in which Tricontinent is borrowing short term.
- The fixed-income strategy could become less profitable or unprofitable if the spread between long-term and short-term interest rates decreases.

6.4. Performance Evaluation Concerns

The chapter on performance evaluation covers the basic concepts of performance evaluation, with components of performance measurement, performance attribution, and performance
appraisal. This section provides further comments and illustrations in the context of hedge funds. In reviewing the performance of a hedge fund, some factors an investor needs to consider are:

- The returns achieved.
- Volatility, not only standard deviation but also downside volatility.
- What performance appraisal measures to use.
- Correlations (to gain information on diversification benefits in a portfolio context).
- Skewness and kurtosis because these affect risk and may qualify the conclusions drawn from a performance appraisal measure.
- Consistency, including the period specificity of performance.

6.4.1. Returns

Hedge funds typically report data to hedge fund data providers monthly, and the default compounding frequency for hedge fund performance evaluation and reporting is monthly. The rate of return reported by hedge funds is the nominal monthly-holding-period return computed as follows:

\[
\text{Rate of return} = \frac{\text{(Ending value of portfolio)} - \text{(Beginning value of portfolio)}}{\text{(Beginning value of portfolio)}}
\]

These returns are typically compounded over 12 monthly periods (or 4 periods if the data are reported quarterly) to obtain the annualized rate of return. The reporting and compounding frequency can materially affect hedge funds’ apparent performance for a number of reasons, including the following:

- Many hedge funds allow entry or exit to their funds quarterly or even less frequently.
- In calculating drawdowns, no compounding is typically applied to the loss.

The issues of leverage and the use of derivatives in return calculation also arise in hedge fund performance evaluation. The calculation convention followed in the hedge fund industry is to “look through” the leverage as if the asset were fully paid. Thus, as the beginning value in the above equation for rate of return, the return on a levered position is based on the amount actually paid plus any borrowing used to fund the purchase. The ending value is, of course, calculated on a consistent basis. Thus, leverage affects the weighting of an asset in the portfolio but not the return on the individual asset. The same principle of deleveraging applies to the computation of the rate of return when derivatives are included in the hedge fund portfolio.\(^\text{115}\)

Investors sometimes examine the rolling returns to a hedge fund. The rolling return, \(RR\), is simply the moving average of the holding-period returns for a specified period (e.g., a calendar year) that matches the investor’s time horizon. For example, if the investor’s time horizon is 12 months, the rolling return would be calculated using

\[
RR_{at} = \frac{(R_t + R_{t-1} + R_{t-2} + \ldots + R_{t-n})}{n}
\]

\(^{115}\)Because derivatives require only a good faith deposit, which is interest yielding, there is no real capital investment involved. The computed rate of return under the assumption that the full value of the derivatives constitutes the investment base is, at best, a pseudo rate of return. Yau, Savanayana, and Schneeweis (1990) examined the impact of different rates of return of derivative investments based on differing computations of the rates of return and found significantly different results in portfolio optimization and hedging programs.
so

\[ RR_{12,t} = (R_t + R_{t-1} + R_{t-2} + \ldots + R_{t-12})/12 \]

Rolling returns provide some insight into the characteristics and qualities of returns. In particular, they show how consistent the returns are over the investment period and identify any cyclicity in the returns.

6.4.2. Volatility and Downside Volatility

As in traditional investments, the standard deviation of returns is a common measure of risk in hedge fund performance. The standard deviation of hedge fund returns is computed in the usual fashion and typically based on monthly returns. The annualized standard deviation is usually computed as the standard deviation of the monthly return times the square root of 12, making the assumption of serially uncorrelated returns. The use of the standard deviation of monthly returns as a measure of risk also makes the implicit assumption that the return distribution follows the normal distribution, at least to a close approximation. As already mentioned, however, hedge funds appear to have more instances of extremely high and extremely low returns than would be expected with a normal distribution (i.e., positive excess kurtosis) and some funds also display meaningful skewness. When those conditions hold, standard deviation incorrectly represents the actual risk of a hedge fund’s strategies.

Downside deviation, or semideviation, is an alternative risk measure that mitigates one critique of standard deviation, namely, that it penalizes high positive returns. Downside deviation computes deviation from a specified threshold (i.e., below a specified return, \( r^* \)); only the negative deviations are included in the calculation. The threshold can be zero (separating gains from losses) or the prevailing short-term rate or any rate chosen by the user. Semideviation uses the average monthly return as the threshold. Once the threshold is determined, the computation resembles that of the standard deviation. Using downside deviation instead of standard deviation recognizes a distinction between good and bad volatility:

\[
\text{Downside deviation} = \sqrt{\frac{\sum_{i=1}^{n} [\min(r_t - r^*, 0)]^2}{n-1}}
\]

where \( \min(A, B) \) means “A or B, whichever is smaller.”

Another popular risk measure is drawdown. As discussed in the chapter on risk management, drawdown in the field of hedge fund management is the difference between a portfolio’s point of maximum net asset value (its high-water mark) and any subsequent low point (until new “high water” is reached). Maximum drawdown is the largest difference between a high-water point and a subsequent low. A portfolio may also be said to be in a position of drawdown from a decline from a high-water mark until a new high-water mark is reached. How long this period lasts is relevant to evaluating hedge fund performance—in particular, its record of recovering from losses.

6.4.3. Performance Appraisal Measures

The most extensively used industry measure to date has been the Sharpe ratio, which measures the average amount of return in excess of the risk-free rate per unit of standard deviation of return. The chapter on performance evaluation

Chapter 8 Alternative Investments Portfolio Management

The Sharpe ratio gives a definition and a discussion, but we may present it as follows, with reference to the ex post performance in a given year:

\[
\text{Sharpe ratio} = \frac{\text{Annualized rate of return} - \text{Annualized risk-free rate}}{\text{Annualized standard deviation}}
\]

In this application, a one-year T-bill yield is usually used to determine the annualized risk-free rate.

The Sharpe ratio has a number of limitations that the hedge fund investor needs to understand:

- The Sharpe ratio is time dependent; that is, the overall Sharpe ratio increases proportionally with the square root of time. An annual Sharpe ratio will therefore be \(\sqrt{12}\) bigger than a monthly Sharpe ratio if returns are serially uncorrelated.\(^{117}\)
- It is not an appropriate measure of risk-adjusted performance when the investment has an asymmetrical return distribution, with either negative or positive skewness.\(^{118}\)
- Illiquid holdings bias the Sharpe ratio upward.
- Sharpe ratios are overestimated when investment returns are serially correlated (i.e., returns trend), which causes a lower estimate of the standard deviation. This occurs with certain hedge fund strategies that may have a problem with stale pricing or illiquidity. Distressed securities may be an example.
- The Sharpe ratio is primarily a risk-adjusted performance measure for stand-alone investments and does not take into consideration the correlations with other assets in a portfolio.
- The Sharpe ratio has not been found to have predictive ability for hedge funds in general. Being a “winner” according to the Sharpe ratio over a past period cannot be relied on to predict future success.
- The Sharpe ratio can be gamed; that is, the reported Sharpe ratio can be increased without the investment really delivering higher risk-adjusted returns. Specifically, Spurgin (2001) showed the following means to gaming the Sharpe ratio:

  1. Lengthening the measurement interval. This will result in a lower estimate of volatility; for example, the annualized standard deviation of daily returns is generally higher than the weekly, which is, in turn, higher than the monthly.
  2. Compounding the monthly returns but calculating the standard deviation from the (not compounded) monthly returns.
  3. Writing out-of-the-money puts and calls on a portfolio. This strategy can potentially increase the return by collecting the option premium without paying off for several years. Strategies that involve taking on default risk, liquidity risk, or other forms of catastrophe risk have the same ability to report an upwardly biased Sharpe ratio. (Examples are the Sharpe ratios of market-neutral hedge funds before and after the 1998 liquidity crisis.) This is similar to trading negative skewness for a greater Sharpe ratio by improving the mean or standard deviation of the investment.\(^{119}\)

\(^{117}\)See Lhabitant (2004).

\(^{118}\)A number of researchers insist that the Sharpe ratio should be interpreted together with the higher moments of the return distribution. For example, Brooks and Kat (2002) found that high Sharpe ratios tend to go together with negative skewness and high kurtosis.

\(^{119}\)See Spurgin (2001) and Anson (2002a) for theoretical proofs and examples.
4. Smoothing of returns. Using certain derivative structures, infrequent marking to market of illiquid assets, and pricing models that understate monthly gains or losses can reduce reported volatility.

5. Getting rid of extreme returns (best and worst monthly returns each year), which increases the standard deviation. Operationally, this entails a total-return swap: One pays the best and worst returns for one’s benchmark index each year, and the counterparty pays a fixed cash flow and hedges the risk in the open market. If swaps are not available, one can do it directly with options.

The **Sortino ratio** replaces standard deviation in the Sharpe ratio with downside deviation. Instead of using the mean rate of return to calculate the downside deviation, the investor’s minimum acceptable return or the risk-free rate is typically used. The chapter on risk management has further comments on this measure. The Sortino ratio is

\[
\text{Sortino ratio} = \frac{\text{Annualized rate of return} - \text{Annualized risk-free rate}}{\text{Downside deviation}}
\]

The **gain-to-loss ratio** measures the ratio of positive returns to negative returns over a specified period of time. The higher the gain-to-loss ratio (in absolute value), the better:

\[
\text{Gain-to-loss ratio} = \frac{\text{Number months with positive returns}}{\text{Number months with negative returns}} \times \frac{\text{Average up-month return}}{\text{Average down-month return}}
\]

In addition, two major appraisal measures based on drawdowns as indicators of risk, the Calmar ratio and the Sterling ratio, have been applied to hedge fund analysis.\(^{120}\)

6.4.4. Correlations Correlations provide information on portfolio diversification. However, correlations are most meaningful when assets’ or strategies’ returns are normally distributed. This fact is an additional reason to consider skewness and kurtosis.

6.4.5. Skewness and Kurtosis To review, skewness is a measure of asymmetry in the distribution of returns. A symmetrical distribution has a skewness of zero; all else being equal, a positive value of skewness is desirable. Kurtosis evaluates the relative incidence of returns clustered near the mean return versus returns extremely far away from the mean. If one investment has higher kurtosis than another, it tends to have more instances of extreme returns.

6.4.6. Consistency Another element in evaluating hedge funds is consistency of results. Consistency analysis is most relevant when comparing funds of the same style or strategy. It is important to look at the number of months that the strategy has had positive (or negative)

---

\(^{120}\) The **Calmar ratio** is the compound annualized rate of return over a specified time period divided by the absolute value of maximum drawdown over the same time period. Frequently, the time horizon is set at three years (36 months), but if three years of data are not available, the available data are used. The **Sterling ratio** is the compound annualized rate of return over a specified time period divided by the average yearly maximum drawdown over the same time period less an arbitrary 10 percent. To calculate this average yearly drawdown, the data period is divided into separate 12-month periods and the maximum drawdown is calculated for each and averaged. The convention for the time horizon follows that of the Calmar ratio.
returns, the number of months that the strategy has had positive (negative) returns when the market is up (down), and the average monthly returns in up and down markets. For consistency, a fund should have a greater percentage of positive returns and less negative returns than the benchmark in all market conditions. We illustrate with the data given in Exhibit 8-29 on page 558. In computing the rolling returns, the relevant holding period for the investor is assumed to be six months. This is simply for illustration purposes. In practice, the rolling returns should match the investor’s investment horizon.

Exhibit 8-30 (page 559) shows the computation of the performance statistics of a hypothetical hedge fund for 12 months from the data given in Exhibit 8-29.

7. MANAGED FUTURES

Managed futures have been used as an investment alternative since the late 1960s. More recently, such institutional investors as corporate and public pension funds, endowments, trusts, and bank trust departments have been including managed futures as one segment of a well-diversified portfolio.

Managed futures are private pooled investment vehicles that can invest in cash, spot, and derivative markets for the benefit of their investors and have the ability to use leverage in a wide variety of trading strategies. Like hedge funds, managed futures programs are actively managed. Similar to hedge funds, with which they are often grouped, managed futures programs are often structured as limited partnerships open only to accredited investors (institutions and high-net-worth individuals). Compensation arrangements for managed futures programs are also similar to those of hedge funds. The primary distinguishing differences between hedge funds and managed futures is that, for the most part, managed futures trade exclusively in derivative markets (future, forward, or option markets) whereas hedge funds tend to be more active in spot markets while using futures markets for hedging. Because hedge funds often trade in individual securities whereas managed futures primarily trade market-based futures and options contracts on broader or more generic baskets of assets, one can view hedge funds as concentrating on inefficiencies in micro (security) stock and bond markets whereas managed futures look for return opportunities in macro (index) stock and bond markets. In addition, in some jurisdictions, managed futures programs have been historically more highly regulated than hedge funds.

7.1. The Managed Futures Market

Managed futures programs are an industry comprising specialist professional money managers. In the United States, such programs are run by general partners known as commodity pool operators (CPOs), who are, or have hired, professional commodity trading advisers to manage money in the pool. In the United States, both CPOs and CTAs are registered with the U.S. Commodity Futures Trading Commission and National Futures Association (a self-regulatory body).

7.1.1. Types of Managed Futures Investments

Managed futures have been described as skill-based investment strategies. Skill-based strategies obtain returns from the unique skill or strategy of the trader. Like hedge funds, managed futures have also been described as absolute-return strategies.

---

**EXHIBIT 8-29  Hypothetical Hedge Fund Consistency Data**

<table>
<thead>
<tr>
<th>Month</th>
<th>Hedge Fund return (%)</th>
<th>Index Return (%)</th>
<th>(HF Return - Hurdle Rate)²</th>
<th>(Index Return - Hurdle Rate)²</th>
<th>1 + HF Return</th>
<th>1 + Index Return</th>
<th>Rolling Six-Month Return of HF</th>
<th>Rolling Six-Month Return of Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>2.5</td>
<td>1.0</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.0250</td>
<td>1.0100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>1.5</td>
<td>1.3</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.0150</td>
<td>1.0130</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>−1.0</td>
<td>−1.6</td>
<td>2.0070</td>
<td>4.0671</td>
<td>0.9900</td>
<td>0.9840</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>−1.2</td>
<td>−2.4</td>
<td>2.6137</td>
<td>7.9338</td>
<td>0.9880</td>
<td>0.9760</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>−1.0</td>
<td>−4.2</td>
<td>2.0070</td>
<td>21.3139</td>
<td>0.9900</td>
<td>0.9580</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>0.9</td>
<td>2.0</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.0090</td>
<td>1.0200</td>
<td>0.0028</td>
<td>−0.0065</td>
</tr>
<tr>
<td>July</td>
<td>−1.0</td>
<td>2.5</td>
<td>2.0070</td>
<td>6.3338</td>
<td>0.9900</td>
<td>1.0250</td>
<td>−0.0030</td>
<td>−0.0040</td>
</tr>
<tr>
<td>August</td>
<td>0.7</td>
<td>−2.1</td>
<td>0.0000</td>
<td>1.0070</td>
<td>0.9790</td>
<td>0.9943</td>
<td>−0.0008</td>
<td>−0.0097</td>
</tr>
<tr>
<td>September</td>
<td>1.1</td>
<td>2.0</td>
<td>0.0000</td>
<td>1.0110</td>
<td>1.0200</td>
<td>1.0008</td>
<td>0.0047</td>
<td>0.0012</td>
</tr>
<tr>
<td>October</td>
<td>2.1</td>
<td>0.5</td>
<td>0.0000</td>
<td>1.0210</td>
<td>1.0050</td>
<td>0.0047</td>
<td>0.0012</td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>1.5</td>
<td>3.1</td>
<td>0.0000</td>
<td>1.0150</td>
<td>1.0310</td>
<td>0.0088</td>
<td>0.0133</td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>1.5</td>
<td>0.2</td>
<td>0.0470</td>
<td>1.0150</td>
<td>1.0020</td>
<td>0.0098</td>
<td>0.0103</td>
<td></td>
</tr>
<tr>
<td>Sum</td>
<td>7.6</td>
<td>2.3</td>
<td>8.6348</td>
<td>39.6955</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.63</td>
<td>0.19</td>
<td></td>
<td></td>
<td>0.0026</td>
<td>0.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.0777</td>
<td>1.0203</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** The hurdle rate is 5 percent per year or 0.4167 percent per month. Deviation from the hurdle rate squared is computed if the fund/index return is less than the hurdle rate; otherwise, it will be equal to zero. The rolling six-month return is computed as $RR_t = (R_t + R_{t-1} + \ldots + R_{t-5})/6$. 
EXHIBIT 8-30  Return and Risk Calculations

<table>
<thead>
<tr>
<th>1. Return</th>
<th>Hedge Fund</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total fund return (= [(1 + r_1)(1 + r_2) \ldots (1 + r_{12})] - 1 = 1.0777 - 1 = 0.0777.)</td>
<td>7.77%</td>
<td>2.03%</td>
</tr>
<tr>
<td>Geometric mean per year: (\text{Fund} = (1.0777^{1/12} - 1) \times 12 = 7.50%).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index (= (1.0203^{1/12} - 1) \times 12 = 2.02%).</td>
<td>7.50%</td>
<td>2.02%</td>
</tr>
<tr>
<td>Rolling six-month returns mean (= (RR_{0,1} + RR_{0.2} + RR_{0.3} + RR_{0.4} + RR_{0.5} + RR_{0.6} + RR_{0.7})/7.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\text{Fund} = (R_0 + R_{-1} + R_{-2} + R_{-3} + R_{-4} + R_{-5} + R_{-6})/6.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\text{Index} = (0.0028 + 0.0030 - 0.0043 - 0.0008 + 0.0047 + 0.0088 + 0.0098)/7 = 0.0026.)</td>
<td>0.26%</td>
<td>0.01%</td>
</tr>
<tr>
<td>Rolling six-month returns (max)</td>
<td>0.98%</td>
<td>1.33%</td>
</tr>
<tr>
<td>Rolling six-month returns (min)</td>
<td>-0.43%</td>
<td>-0.97%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Risk</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized standard deviation</td>
<td>4.62%</td>
</tr>
<tr>
<td>Annualized downside deviation:</td>
<td>7.87%</td>
</tr>
<tr>
<td>Hurdle rate = 5% per year.</td>
<td></td>
</tr>
<tr>
<td>(\text{Fund} = \sqrt{8.6.948/(12 - 1) \times \sqrt{12}} = 3.07.)</td>
<td>3.07%</td>
</tr>
<tr>
<td>3. Appraisal</td>
<td></td>
</tr>
<tr>
<td>Sharpe ratio (per year) (= (\text{Return} - 5%)/\text{Standard deviation}:)</td>
<td></td>
</tr>
<tr>
<td>(\text{Fund} = (7.5 - 5)/4.62 = 0.54.)</td>
<td>0.54</td>
</tr>
<tr>
<td>Index (= (2.02 - 5)/7.87 = -0.38.)</td>
<td>-0.38</td>
</tr>
<tr>
<td>Sortino ratio (per year) (= (\text{Return} - 5%)/\text{Downside deviation}:)</td>
<td></td>
</tr>
<tr>
<td>(\text{Fund} = (7.5 - 5)/3.07 = 0.81.)</td>
<td>0.81</td>
</tr>
<tr>
<td>Index (= (2.02 - 5)/6.58 = -0.45.)</td>
<td>-0.45</td>
</tr>
<tr>
<td>Gain/Loss :</td>
<td></td>
</tr>
<tr>
<td>(\text{Fund} = (1.475 - -1.05) \times (8/4) = -2.82.)</td>
<td>-2.82</td>
</tr>
<tr>
<td>Index (= (1.575 - 2.575) \times (8/4) = -1.22.)</td>
<td>-1.22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Consistency</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of months</td>
<td>12</td>
</tr>
<tr>
<td>Number of positive months</td>
<td>8</td>
</tr>
<tr>
<td>Percentage of positive months</td>
<td>66.67%</td>
</tr>
<tr>
<td>Average return in up-months</td>
<td>1.48%</td>
</tr>
<tr>
<td>Number of negative months</td>
<td>4</td>
</tr>
<tr>
<td>Percentage of negative months</td>
<td>33.33%</td>
</tr>
<tr>
<td>Average return in down-months</td>
<td>-1.05%</td>
</tr>
<tr>
<td>Average monthly return in index up-months :</td>
<td></td>
</tr>
</tbody>
</table>
| \(\text{Fund} = (2.5 + 1.5 + 0.9 - 1.0 + 1.1 + 2.1 + 1.5 + 1.5)/8 = 1.263.\) | 1.26%
| Index \(= (1.0 + 1.3 + 2.0 + 2.5 + 2.0 + 0.5 + 3.1 + 0.2)/8 = 1.575.\) | 1.58% |
| Average monthly return in index down months \(= (-1.0 - 1.2 - 1.0 + 0.7)/4 = -0.625.\) | -0.63% |
| 5. Correlation between fund and index returns—12 months | | 0.53 |

Note: The arithmetic means used in the computation of standard deviation were computed as 0.63 percent and 0.19 percent for, respectively, the fund and the index.
In addition to private commodity pools, managed futures programs are also available in separately managed accounts (sometimes known as CTA managed accounts). Publicly traded commodity funds open to smaller investors are also available. Managed futures programs may use a single manager or multiple managers.

Managed futures funds share the compensation structure of hedge funds consisting of a management fee plus incentive fee, with a 2 plus 20 arrangement the most common structure.

Managed futures may be classified according to investment style. They are often classified into subgroups on the basis of investment style (e.g., systematic or discretionary), markets traded (e.g., currency or financial), or trading strategy (e.g., trend following or contrarian). Managed futures are at times viewed as a subset of global macro hedge funds, in that they also attempt to take advantage of systematic moves in major financial and nonfinancial markets, primarily through trading futures and option contracts.

The trading strategies of managed futures include the following:

• **Systematic trading strategies** trade primarily according to a rule-based trading model usually based on past prices. Most systematic CTAs invest by using a trend-following program, although some trade according to a contrarian, or countertrend, program. In addition, trend-following CTAs may concentrate on short-term trends, medium-term trends, long-term trends, or a combination thereof.

• **Discretionary trading strategies** trade financial, currency, and commodity futures and options. Unlike systematic strategies, they involve portfolio manager judgment. Discretionary trading models include those based on fundamental economic data and on trader beliefs. Traders often use multiple criteria in making trading decisions.

By the markets emphasized in trading, managed futures may be classified as:

• **Financial** (trading financial futures/options, currency futures/options, and forward contracts).

• **Currency** (trading currency futures/options and forward contracts).

• **Diversified** (trading financial futures/options, currency futures/options, and forward contracts, as well as physical commodity futures/options).

A market classification can also be used to distinguish subcategories of systematic and discretionary trading strategies.

7.1.2. Size of the Managed Futures Market  
Worldwide, the managed futures industry has grown from less than US$1 billion under management in 1980 to approximately US$130 billion under management in 2004. These numbers do not include the large amount of funds traded through hedge funds (e.g., global asset allocators) or proprietary trading desks of large investment houses, insurance companies, or banks that use strategies similar to those of independent CTAs. The estimate is from Barclays Trading Group. To put this last figure in perspective, consider that the managed futures industry is probably somewhat less than 10 percent the size of the hedge fund industry as judged by assets under management.

7.2. Benchmarks and Historical Performance  
The benchmarks for managed futures are similar to those for hedge funds, in that indices represent performance of a group of managers who use a similar trading strategy or style.
EXHIBIT 8-31  CTA Performance, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>CISDM</th>
<th>CTA$</th>
<th>HFCI</th>
<th>S&amp;P 500</th>
<th>Lehman Gov./Corp.</th>
<th>MSCI World</th>
<th>Lehman Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>10.85%</td>
<td>13.46%</td>
<td>10.94%</td>
<td>7.77%</td>
<td>7.08%</td>
<td>8.09%</td>
<td></td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>9.96%</td>
<td>5.71%</td>
<td>14.65%</td>
<td>4.46%</td>
<td>14.62%</td>
<td>5.23%</td>
<td></td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.66</td>
<td>1.61</td>
<td>0.45</td>
<td>0.78</td>
<td>0.19</td>
<td>0.73</td>
<td></td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−6.00%</td>
<td>−6.92%</td>
<td>−14.46%</td>
<td>−4.19%</td>
<td>−13.32%</td>
<td>−3.66%</td>
<td></td>
</tr>
<tr>
<td>Correlation w/CTA$</td>
<td>1.00</td>
<td>0.19</td>
<td>−0.10</td>
<td>0.29</td>
<td>−0.11</td>
<td>0.27</td>
<td></td>
</tr>
</tbody>
</table>

*Note: CTA$ is the dollar-weighted CTA universe.*

*Source: CISDM (2005d).*

7.2.1. Benchmarks  Investable benchmarks for actively managed derivative strategies exist. Such indices replicate the return to a mechanical, trend-following strategy in a number of financial and commodity futures markets. For example, the Mount Lucas Management Index takes both long and short positions in a number of futures markets based on a technical (moving-average) trading rule that is, in effect, an active momentum strategy.

The CISDM CTA trading strategy benchmarks are examples of benchmarks based on peer groups of CTAs. The dollar-weighted (CTA$) and equal-weighted (CTAEQ) CISDM indices reflect manager returns for all reporting managers in the CISDM database on, respectively, a dollar-weighted and equal-weighted basis. The CISDM CTA indices include indices for systematic versus discretionary strategies, for groups based on market emphasis (financial, currency, diversified), and for trend following versus contrarian. For example, the CTA trend-following index may include financial, currency, and diversified trend-following CTAs.

7.2.2. Historical Performance  The performance of managed futures on an individual basis and as a group is of interest. For the 1990 to 2004 period, the annualized standard deviations of individual CTAs in the CISDM alternative investment database were, on average, comparable to the averaged annualized standard deviations of U.S. blue chip stocks. As Exhibit 8-31 shows, on a portfolio basis, for the 1990 to 2004 period, the volatility of the CTA$ Index (9.96 percent) was less than that of either the S&P 500 (14.65 percent) or MSCI World Index (14.62 percent) but greater than that of U.S. or global bonds (4.46 percent and 5.23 percent, respectively). The Sharpe ratio for the CTA$ was better than those of equities but not those of bonds. Exhibit 8-32 shows that results for a more recent period (2000 to 2004) are qualitatively similar. Noteworthy is that the correlations of the CISDM CTA$ with the equity indices are slightly negative; the correlations of the CISDM CTA$ with U.S. and global bonds are similar at 0.42 and 0.46, respectively.

Exhibit 8-33 displays the correlations among CTA investment strategies, which range from moderate to highly positive. The correlation of trend-following with discretionary is among the lowest at 0.51. In general, the correlations among CTA strategies appear to be influenced by the degree to which the strategies are trend following or discretionary. The overall dollar-weighted and equal-weighted indices are highly correlated with diversified, financial,

---

123The average annualized standard deviation of the individual CTAs that have complete data for 1990 to 2004 in the CISDM database is 27.06 percent vs. 28.54 percent for the individual component stocks in the DJIA (CISDM 2005d). Annualized standard deviations are derived by multiplying the monthly data by the square root of 12.
EXHIBIT 8-32  Recent CTA Performance, 2000–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>CISDM</th>
<th>HFCI</th>
<th>S&amp;P 500</th>
<th>Lehman</th>
<th>MSCI</th>
<th>Lehman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>7.89%</td>
<td>6.84%</td>
<td>−2.30%</td>
<td>8.00%</td>
<td>8.51%</td>
<td></td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>8.66%</td>
<td>4.83%</td>
<td>16.35%</td>
<td>4.76%</td>
<td>15.62%</td>
<td>6.00%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.60</td>
<td>0.86</td>
<td>−0.31</td>
<td>1.11</td>
<td>−0.30</td>
<td>0.97</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−5.12%</td>
<td>−2.94%</td>
<td>−10.87%</td>
<td>−4.19%</td>
<td>−10.98%</td>
<td>−3.66%</td>
</tr>
<tr>
<td>Correlation w/CTA$</td>
<td>1.00</td>
<td>0.18</td>
<td>−0.25</td>
<td>0.42</td>
<td>−0.18</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Source: CISDM (2005d).

EXHIBIT 8-33  Correlations of CISDM CTA Universe Strategies, 1990–2004

<table>
<thead>
<tr>
<th>CTAS $</th>
<th>CTAEQ</th>
<th>Currency</th>
<th>Discretionary</th>
<th>Diversified</th>
<th>Financial</th>
<th>Trend Following</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>0.94</td>
<td>0.66</td>
<td>0.62</td>
<td>1.00</td>
<td>0.63</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.63</td>
<td>0.54</td>
<td>0.44</td>
<td>1.00</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.94</td>
<td>0.93</td>
<td>0.54</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.93</td>
<td>0.59</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.95</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.96</td>
</tr>
</tbody>
</table>

Source: CISDM (2005d).

EXHIBIT 8-34  Performance of CISDM CTA Universe Strategies and Traditional Assets, 1990–2004

<table>
<thead>
<tr>
<th>Strategy or Class</th>
<th>Return</th>
<th>Standard Deviation</th>
<th>Sharpe Ratio</th>
<th>Minimum Monthly Return</th>
<th>Correlation w/CTA$</th>
<th>Correlation w/CTA$</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISDM CTAS $</td>
<td>10.85%</td>
<td>9.96%</td>
<td>0.66</td>
<td>−6.00%</td>
<td>−0.10</td>
<td>0.29</td>
</tr>
<tr>
<td>CISDM CTAEQ</td>
<td>9.33</td>
<td>9.58</td>
<td>0.53</td>
<td>−5.43</td>
<td>−0.16</td>
<td>0.26</td>
</tr>
<tr>
<td>CISDM Currency</td>
<td>9.24</td>
<td>11.80</td>
<td>0.42</td>
<td>−8.17</td>
<td>0.05</td>
<td>0.15</td>
</tr>
<tr>
<td>CISDM Discretionary</td>
<td>11.78</td>
<td>6.51</td>
<td>1.15</td>
<td>−4.57</td>
<td>−0.05</td>
<td>0.21</td>
</tr>
<tr>
<td>CISDM Diversified</td>
<td>9.56</td>
<td>11.42</td>
<td>0.46</td>
<td>−7.53</td>
<td>−0.14</td>
<td>0.27</td>
</tr>
<tr>
<td>CISDM Financial</td>
<td>11.76</td>
<td>12.83</td>
<td>0.58</td>
<td>−8.56</td>
<td>−0.09</td>
<td>0.35</td>
</tr>
<tr>
<td>CISDM Trend following</td>
<td>11.30</td>
<td>16.24</td>
<td>0.43</td>
<td>−10.38</td>
<td>−0.16</td>
<td>0.29</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>10.94</td>
<td>14.65</td>
<td>0.50</td>
<td>−14.46</td>
<td>1.00</td>
<td>0.10</td>
</tr>
<tr>
<td>Lehman Gov./Corp.</td>
<td>7.77</td>
<td>4.46</td>
<td>0.80</td>
<td>−4.19</td>
<td>0.10</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Source: CISDM (2005d).

and trend-following strategies and distinctly less correlated with currency and discretionary strategies.

Exhibit 8-34 complements the information that was provided in Exhibit 8-31 by adding performance information on the CTA strategies, including correlations with U.S. equity and bond indices. Across CTA strategies, correlations with U.S. equities are low and correlations with U.S. bonds are low or moderate.
7.2.3. Interpretation Issues  
In evaluating historical managed futures return data, the investor should be aware of the upward bias that survivorship can impart. Research has found return differences on the order of 3.5 percent between the surviving CTAs and the full sample that includes defunct CTAs.\textsuperscript{124} The differential performance between survivor and nonsurvivor samples (on an absolute basis and a risk-adjusted basis) comes chiefly from differences in return performance in the months just prior to CTA dissolution. The ability of investment professionals to forecast which managers may not survive could result in dramatic differences in investment results.\textsuperscript{125}

7.3. Managed Futures: Investment Characteristics and Roles

Similar to hedge funds, managed futures are active skill-based strategies that investors can examine for the potential to improve a portfolio’s risk and return characteristics. In the following sections, we present more details on these investments.

7.3.1. Investment Characteristics  
This discussion of investment characteristics will focus on the market opportunities that may be exploited by CTAs. Derivative markets are zero-sum games.\textsuperscript{126} As a result, the long-term return to a passively managed, unlevered futures position should be the risk-free return on invested capital less management fees and transaction costs. For derivative-based investment strategies like managed futures to produce excess returns, on average, there must be a sufficient number of hedgers or other users of the markets who systematically earn less than the risk-free rate. Hedgers, for example, may pay a risk premium to liquidity providers for the insurance they obtain. If that condition is met, managed futures may be able to earn positive excess returns (i.e., be the winning side in the zero-sum transactions).

The zero-sum nature of derivatives markets also does not restrict CTAs from attempting to conduct arbitrage when relationships are out of equilibrium. Institutional characteristics and differential carrying costs among investors may permit managed fund traders to take advantage of short-term pricing differences between theoretically identical stock, bond, futures, options, and cash market positions. CTAs may also attempt to take advantage of the opportunity of trading in trending markets.

Most actively managed derivative strategies follow momentum strategies. In equity markets, research has begun to support the notion that short-term momentum-based strategies may be able to produce excess returns; the evidence related to the market opportunity in futures markets is less well developed.\textsuperscript{127} Government policy intervention in interest rate and currency markets may cause trending in currency and fixed-income markets. Some corporate risk management approaches may result in trading that creates short-term trending. Trading techniques based on capturing these price trends, whatever the source, may be profitable. There is also evidence that momentum trading imparts the desirable characteristic of positive skewness to managed fund returns.

Because of the ease with which futures traders take short positions, futures traders can attempt to earn positive excess returns in falling as well as rising markets. Some of the most

\textsuperscript{124}See Fung and Hsieh (1997b) and McCarthy et al. (1996).
\textsuperscript{125}For research in the area of manager default, see Diz (1999).
\textsuperscript{126}The term zero sum refers to the fact that derivatives markets reallocate uncertain cash flows among market participants without enhancing aggregate cash flows in any way. See Gastineau and Kritzman (1999).
\textsuperscript{127}See Lee and Swaminathan (2000) and references therein for the evidence on momentum strategies in U.S. equity markets.
EXHIBIT 8-35 Managed Futures Performance in Portfolios, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>Portfolio I</th>
<th>Portfolio II</th>
<th>Portfolio III</th>
<th>Portfolio IV</th>
<th>Portfolio V</th>
<th>Portfolio VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>9.64%</td>
<td>10.43%</td>
<td>10.54%</td>
<td>7.86%</td>
<td>9.01%</td>
<td>9.26%</td>
</tr>
<tr>
<td>Annualized std. deviation</td>
<td>7.94%</td>
<td>7.09%</td>
<td>6.48%</td>
<td>8.29%</td>
<td>7.28%</td>
<td>6.65%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.67</td>
<td>0.87</td>
<td>0.97</td>
<td>0.43</td>
<td>0.65</td>
<td>0.75</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−6.25%</td>
<td>−6.39%</td>
<td>−5.21%</td>
<td>−5.61%</td>
<td>−5.87%</td>
<td>−4.75%</td>
</tr>
<tr>
<td>Correlation w/CISDM CTA$</td>
<td>−0.01</td>
<td>0.02</td>
<td>n/c</td>
<td>−0.01</td>
<td>0.02</td>
<td>n/c</td>
</tr>
</tbody>
</table>

Notes:
Portfolio I = 50 percent S&P 500, 50 percent Lehman Gov./Corp. Bond.
Portfolio II = 40 percent S&P 500, 40 percent Lehman Gov./Corp., 20 percent HFCI.
Portfolio III = 90 percent Portfolio II, 10 percent CTA$.
Portfolio IV = 50 percent MSCI World, 50 percent Lehman Global Bond.
Portfolio V = 40 percent MSCI World, 40 percent Lehman Global, 20 percent HFCI.
Portfolio VI = 90 percent Portfolio V, 10 percent CTA$.
n/c = not computed.
Source: CISDM (2005d).

impressive periods of return for CTAs have been during periods of poor performance in the equity markets (e.g., October 1987). Access to options markets permits managed futures and hedge fund traders to create positions that attempt to exploit changes in market volatility of the underlying asset (volatility being one of the determinants of option value). Such strategies are not available to investors who are restricted to using cash markets.

Because managed futures can replicate many strategies available to a cash market investor at a lower cost—and allow strategies that are unavailable to cash investors—factor models for this group must include the factors that may be unique to managed futures and hedge fund trading opportunities.\(^{128}\)

To the degree that different factors explain managed futures returns and stock/bond returns, managed futures may provide investors exposure to unique sources of return. The presence of such risk factors also provides an economic rationale for managed futures’ diversification capabilities when added to a portfolio of equities and bonds.

7.3.2. Roles in the Portfolio

As for the other alternative investments, we now offer historical evidence on the potential of managed futures as part of a portfolio. Managed futures appear to be useful in diversifying risk even in a diversified portfolio of stocks, bonds, and hedge funds.

Exhibit 8-35 shows that, for the period 1990 to 2004, managed futures would have been a valuable addition to a stock/bond/hedge fund portfolio in relation both to U.S. and global stocks and bonds. The Sharpe ratio of Portfolios III and VI, which include at least a 10 percent investment in managed futures, dominate those invested only in stocks, bonds, and hedge funds, whether the stocks and bonds are U.S. or global (see Portfolio III versus Portfolio II for the U.S. comparison and Portfolio VI versus Portfolio V for the global comparison). The portfolios with managed futures also improve on the portfolios invested only in stocks and bonds (Portfolio I for the U.S., Portfolio IV for global).

\(^{128}\)For a discussion of whether managed futures returns are the natural result of market forces or are based primarily on trader skills, see Schneeweis and Spurgin (1996).
Chapter 8  Alternative Investments Portfolio Management

EXHIBIT 8-36  Recent Managed Futures Performance in Portfolios, 2000–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>Portfolio I</th>
<th>Portfolio II</th>
<th>Portfolio III</th>
<th>Portfolio IV</th>
<th>Portfolio V</th>
<th>Portfolio VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>3.15%</td>
<td>3.92%</td>
<td>4.37%</td>
<td>3.45%</td>
<td>4.16%</td>
<td>4.58%</td>
</tr>
<tr>
<td>Annualized std. deviation</td>
<td>7.93%</td>
<td>6.94%</td>
<td>6.22%</td>
<td>8.55%</td>
<td>7.48%</td>
<td>6.81%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.06</td>
<td>0.18</td>
<td>0.27</td>
<td>0.09</td>
<td>0.19</td>
<td>0.28</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−4.36%</td>
<td>−3.62%</td>
<td>−3.07%</td>
<td>−4.94%</td>
<td>−4.08%</td>
<td>−3.48%</td>
</tr>
<tr>
<td>Correlation w/CTA$</td>
<td>−0.13</td>
<td>−0.10</td>
<td>n/c</td>
<td>0.00</td>
<td>0.02</td>
<td>n/c</td>
</tr>
</tbody>
</table>

Notes:
- Portfolio I = 50 percent S&P 500, 50 percent Lehman Gov./Corp. Bond.
- Portfolio II = 40 percent S&P 500, 40 percent Lehman Gov./Corp., 20 percent HFCI.
- Portfolio III = 90 percent Portfolio II, 10 percent CTA$.
- Portfolio IV = 50 percent MSCI World, 50 percent Lehman Global Bond.
- Portfolio V = 40 percent MSCI World, 40 percent Lehman Global, 20 percent HFCI.
- Portfolio VI = 90 percent Portfolio V, 10 percent CTA$.
- n/c = not computed.

Source: CISDM (2005d).

Exhibit 8-36 breaks out the results for the five most recent years covered in Exhibit 8-35. For 2000–2004 also, managed futures would have provided better risk-adjusted performance than the comparison portfolios. The Sharpe ratio of an equally weighted stock and bond portfolio is 0.06, and the Sharpe ratio of an equally weighted stock and bond portfolio with a 20 percent hedge fund component is 0.18, whereas adding a 10 percent CTA allocation to the stock/bond/hedge fund portfolio resulted in a Sharpe ratio of 0.27.129

The performance of managed futures has also been examined in the peer-reviewed literature. The conclusions appear to be investment-vehicle dependent and, to some extent, time-period and strategy dependent. On the one hand, a number of studies found that publicly traded commodity funds have been poor investments either on a stand-alone basis or as part of a diversified portfolio.130 On the other hand, some research has concluded that private commodity pools and CTA-based managed accounts do have value either as stand-alone investments, as part of a portfolio, or in both roles.131 Note that many CTAs prefer not to offer their services through public or private pools, so distinctions as to investment vehicle matter in interpreting results.132

129Considerable research exists on the risk reduction benefits of managed futures. In short, the academic (Schneeweis et al., 1996) and practitioner (Schneeweis, 1996) literature has shown that the returns of managed futures have a low correlation with the returns of traditional investment vehicles, such as stocks and bonds. Recent research has shown that when managed futures returns were segmented according to whether the stock/bond market rose or fell, managed futures had a negative correlation when these cash markets posted significant negative returns and a positive correlation when these cash markets reported significant positive returns. Thus, managed futures may also offer unique asset allocation properties in differing market environments.

130For example, Elton et al. (1987, 1990) and Edwards and Park (1996).


132The value of commodity funds, in contrast to investing directly with CTAs, has been questioned by Schneeweis (1996). Schneeweis, however, also concludes that the results are strategy and time-period
It appears that an investor can fairly closely track the performance of a CTA-based managed futures index by using a small random selection of CTAs. Henker and Martin (1998) provided empirical evidence that a naively (e.g., randomly) chosen CTA portfolio replicates comparison CTA benchmark indices. They showed that a portfolio of randomly selected CTAs has a correlation in excess of 0.90 with that of a commonly cited benchmark (the Managed Account Reports dollar-weighted CTA index). Henker and Martin also showed that for CTAs, as for equity securities, a randomly selected equally weighted portfolio of 8 to 10 CTAs has a standard deviation similar to that of the population from which it is drawn.

These results, taken as a whole, suggest that the forecasted returns to a CTA-based managed futures index can be useful for determining the optimal asset allocation to managed futures when the investor will invest with a relatively limited number of CTAs. Henker and Martin also concluded, as did Billingsley and Chance (1996), that fewer than 10 CTAs are needed to achieve most of the benefits of including CTAs in an existing stock and bond portfolio.

7.3.3. Other Issues

Performance persistence in CTA managers has been actively debated in the academic community. Although there is little evidence that a strategy of investing in winners and avoiding losers will be successful over time, there is some evidence of performance persistence. McCarthy et al. (1996), showed that the relative riskiness of a CTA—the CTA’s beta with respect to an index of CTAs—is a good predictor of future relative returns. Thus, past CTA performance may be valuable in forecasting CTA and multi-adviser CTA portfolios’ return and risk parameters, especially at the portfolio level. In terms of public policy, public disclosure of individual CTAs as well as benchmark information may be of benefit to potential investors who want to forecast expected risk-adjusted performance of public commodity funds.

Because managed futures frequently use derivatives and leverage in their strategies, investors should conduct the same due diligence as described in the hedge fund section. Particular attention should be paid to the risk management practices of the CTA.

EXAMPLE 8-13  Adding Managed Futures to the Strategic Asset Allocation

Andrew Cassano, CIO of a large charitable organization, is meeting with his senior analyst, Lori Wood, to discuss managed futures. Wood presents Cassano with information taken from Exhibits 8-31 and 8-35.

1. Using data from these two exhibits, determine whether the addition of managed futures to a portfolio comprising world equities, global bonds, and hedge fund strategies would improve the risk/return profile of that portfolio. Justify your response with reference to two statistics provided in the exhibits.

dependent. Given that commodity funds are often multimanager in form, the benefits of commodity fund investment relative to multiple CTA investment is primarily a function of the fee structure.

133See also Park and Staub (1998).
135Similar results were reported by Brorsen (1998).
**EXHIBIT 8-31** (excerpted). CTA Performance, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>CTA$</th>
<th>HFCI</th>
<th>MSCI World Index</th>
<th>Lehman Global Bond Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>10.85%</td>
<td>13.46%</td>
<td>7.08%</td>
<td>8.09%</td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>9.96%</td>
<td>5.71%</td>
<td>14.62%</td>
<td>5.23%</td>
</tr>
<tr>
<td>Correlation w/CTA$</td>
<td>1.00</td>
<td>0.19</td>
<td>−0.11</td>
<td>0.27</td>
</tr>
</tbody>
</table>

*Note: CTA$ is the dollar-weighted CISDM CTA universe
Source: CISDM (2005d).*

**EXHIBIT 8-35** (excerpted). Managed Futures Performance in Portfolios, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>Portfolio I</th>
<th>Portfolio II</th>
<th>Portfolio III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>7.86%</td>
<td>9.01%</td>
<td>9.26%</td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>8.29%</td>
<td>7.28%</td>
<td>6.65%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>0.43</td>
<td>0.65</td>
<td>0.75</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−5.61%</td>
<td>−5.87%</td>
<td>−4.75%</td>
</tr>
<tr>
<td>Correlation w/CTA$</td>
<td>−0.01</td>
<td>0.02</td>
<td>n/a</td>
</tr>
</tbody>
</table>

*Notes: Portfolio I = 50 percent MSCI World, 50 percent Lehman Global Bond.
Portfolio II = 40 percent MSCI World, 40 percent Lehman Global, 20 percent HFCI.
Portfolio III = 90 percent Portfolio II, 10 percent CTA$.
Source: CISDM (2005d).*

Cassano addresses Wood as follows: “You’ve explained why the Sharpe ratio may not be the most representative indicator of risk with respect to hedge fund strategies. Are there other statistics that could be useful as potential predictors of performance persistence for CTA managers?”

2. With respect to Cassano’s question, recommend another statistic that research has shown to be a useful predictor of performance persistence among CTAs.

Cassano states: “If managed futures are a subset of hedge funds, including them in the portfolio may be redundant if we also invest in other hedge funds. We won’t gain any diversification benefits.”

3. Critique Cassano’s statement and justify your response with reference to data in the two exhibits.

**Solution to Problem 1:** The Sharpe ratio for Portfolio III, which incorporates an allocation of 10 percent to managed futures, improves on the Sharpe ratio of Portfolio II. Therefore, managed futures appear to be valuable when added to a portfolio of world equities, global bonds, and hedge fund strategies. All measures of risk provided (Sharpe ratio, standard deviation, and minimum monthly return) are superior for Portfolio III.

**Solution to Problem 2:** Research has indicated that the relative riskiness of a CTA (i.e., the commodity trading adviser’s beta with respect to an index of CTAs) is a good predictor of future relative returns. Thus, past CTA performance may be valuable in
Solution to Problem 3: The correlation of the hedge fund composite with the CISDM CTA$ composite in Exhibit 8-31 is only 0.19, suggesting that combining investments in these vehicles would provide significant diversification benefits. This is also demonstrated in the low correlation of the first two portfolios with the CTA$ Index (shown in Exhibit 8-35), which indicates that the derivative trading strategies of managed futures may provide unique sources of return when compared with hedge fund strategies that have relatively high exposure to traditional equity and bond markets.

The next section discusses investment strategies based on the equity and, especially, the debt of distressed companies.

8. DISTRESSED SECURITIES

Distressed securities are the securities of companies that are in financial distress or near bankruptcy. In the United States, investing in distressed securities involves purchasing the claims of companies that have already filed for Chapter 11 (protection for reorganization) or are in immediate danger of doing so. Under Chapter 11 protection, companies try to avoid Chapter 7 (protection for liquidation) through an out-of-court debt restructuring with their creditors.

Investment strategies using distressed securities exploit the fact that many investors are unable to hold below-investment-grade securities because of regulatory or investment policy restrictions. Furthermore, relatively few analysts cover distressed securities markets and bankruptcies, resulting in unresearched investment opportunities for knowledgeable investors who are prepared to do their homework. Skill in influencing management and skill in negotiation are other qualities that can be rewarded in this field.

Debt and equity are traditional asset classes. Yet, because of the special characteristics and risks of the debt and equity of distressed companies and the strategies that use them, distressed securities investing is widely viewed as an alternative investment. Contributing to this perspective is the fact that among the most active investors in the field are hedge funds and private equity funds.

8.1. The Distressed Securities Market

Distressed securities investing has a long history—in the United States, dating back to at least the 1930s, when Max L. Heine formed an investment firm specializing in selectively acquiring the debt and real estate of bankrupt railroads. Through the 1980s and early 1990s, individual professional investors, private buyout funds, and others became increasingly active in the securities (and sometimes real assets) of troubled and bankrupt companies in many industries. With the explosive growth in hedge funds, with their flexibility to take short and long positions across all markets, and an abundant supply of troubled companies, by the 2000s, distressed

136 “Chapter” in this context refers to a section of the U.S. Bankruptcy Code.
securities investing had become well established as a set of skill-based strategies. The market opportunities for this strategy increase with higher default rates on speculative-grade bonds (which have historically averaged about 5 percent per year in the United States) and decrease with the number of distressed debt investors competing for mispriced securities.

8.1.1. Types of Distressed Securities Investments  Investors may access distressed securities investing through two chief structures:

1. *Hedge fund structure.* This is the dominant type. For the hedge fund manager, it offers the advantage of being able to take in new capital on a continuing basis. The AUM fee and incentive structure, particularly when there is no hurdle rate associated with the incentive fee, may be more lucrative than with other structures. Investors generally enjoy more liquidity (that is, can withdraw capital more easily) than with other structures.

2. *Private equity fund structure.* Private equity funds have a fixed term (i.e., a mandated dissolution date) and are closed end (they close after the offering period has closed). This structure has advantages where the assets are highly illiquid or difficult to value. An NAV fee structure may be problematic when it is difficult to value assets. When assets are illiquid, hedge fund–style redemption rights may be inappropriate to offer.

There are also structures that are hybrids of the hedge fund and private equity fund structures. In addition, distressed securities investing may be conducted in traditional investment structures, such as separately managed accounts, and even in open-end investment companies (mutual funds).\(^{137}\) As a result of this variety, the investor can find information about distressed securities investing in hedge fund and private equity sources and elsewhere.

Distressed securities managers may themselves invest or trade in many types of assets, including the following:

- The publicly traded debt and equity securities of the distressed company.
- Newly issued equity of a company emerging from reorganization that appears to be undervalued (*orphan equity*).
- Bank debt and trade claims, because banks and suppliers owed money by the distressed company may want to realize the cash value of their claims. When the company is in reorganization, these instruments would be bankruptcy claims.
- “Lender of last resort” notes.
- A variety of derivative instruments for hedging purposes—in particular, for hedging the market risk of a position.

8.1.2. Size of the Distressed Securities Market  The appropriate measure of the size of the distressed securities marketplace is elusive. One measure would aggregate all the assets under management related to distressed securities in whatever investment structure such assets are managed. Nevertheless, the size of the high-yield bond market can give an indication of the potential supply of opportunities, because distressed debt is one part of that market—in particular, the highest-risk part. Based on a maximum quality rating of Ba1 (as determined by Moody’s Investors Services), the U.S. high-yield market consisted of US$548 billion at face value and US$552 billion at market value as of the end of May 2004. This size can be compared with the market size of only US$69 billion at face value as of the end of 1991.

\(^{137}\) In such traditional structures as mutual funds, long-only type investing would be expected.

<table>
<thead>
<tr>
<th>Moment</th>
<th>HFR Fixed-Income High-Yield Index</th>
<th>HFR Distressed Securities Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.80%</td>
<td>1.23%</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>1.84%</td>
<td>1.77%</td>
</tr>
<tr>
<td>Skewness</td>
<td>−0.80</td>
<td>−0.68</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>6.63</td>
<td>5.55</td>
</tr>
</tbody>
</table>


8.2. Benchmarks and Historical Performance

Hedge fund industry data are the chief source for evaluating modern distressed securities investing.

8.2.1. Benchmarks  In the context of hedge funds, distressed securities investing is often classed as a substyle of event-driven strategies. All major hedge fund indices that we discussed in the hedge fund section have a subindex for distressed securities, for example, the EACM, CISDM, and HFR indices all have distressed securities subindices. In the United States, returns to the Altman–NYU Salomon Center Defaulted Public Bond and Bank Loan Index also provide a comparison point for evaluating a long-only value strategy in distressed debt.

8.2.2. Historical Performance  The returns on distressed securities investing can be quite rewarding. Exhibit 8-37 presents historical performance for distressed securities and high-yield fixed-income securities. Using the monthly HFR Distressed Securities Index for the period January 1990 to December 2004, Exhibit 8-37 shows that the return distribution for distressed securities is distinctly non-normal. In particular, it reflects significant downside risk, with a negative skewness of −0.68. The negative skewness indicates that, for distressed securities, large negative returns are more likely than large positive returns. Hence, there is a bias to the downside. In addition, the monthly return distribution displays a large degree of kurtosis (5.55). This indicates that these securities are exposed to large outlier events. The two statistics together indicate significant downside risk. Consequently, the Sharpe ratio, which is based on the normal distribution assumption, may not capture the complete risk–return trade-off of distressed securities investing.

The monthly return distribution of high-yield debt displays similar risk characteristics, with a negative skewness of −0.80 and a kurtosis of 6.63. Overall, high-yield debt investing, although producing favorable returns over the period, was subject to considerable credit and, probably, event risk. These risks were greater, however, than those observed for the distressed securities investing.

Exhibit 8-38 shows that for the same period, distressed securities outperformed all stock and bond investments with a standard deviation of 6.13 percent, compared with the S&P 500’s 14.65 percent. The Sharpe ratio for the HRF Distressed Securities Index is 1.59, which is greater than the ratio for all the other assets. High mean returns with low standard deviation seem to be an attractive characteristic of this strategy. Moreover, the minimum one-month return is less negative for distressed securities than for U.S. and world equities. Low correlation with world stock and bond investments suggest that adding distressed securities to a portfolio of world stocks and bonds might increase return and reduce risk. Because returns of
EXHIBIT 8-38  Distressed Securities Performance, 1990–2004

<table>
<thead>
<tr>
<th>Measure</th>
<th>HFR Distressed Securities</th>
<th>S&amp;P 500</th>
<th>Lehman Global Bond</th>
<th>MSCI World</th>
<th>Lehman Gov./Corp. Bond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>14.76%</td>
<td>10.94%</td>
<td>8.09%</td>
<td>7.08%</td>
<td>7.77%</td>
</tr>
<tr>
<td>Annualized std. dev.</td>
<td>6.13%</td>
<td>14.65%</td>
<td>5.23%</td>
<td>14.62%</td>
<td>4.46%</td>
</tr>
<tr>
<td>Sharpe ratio</td>
<td>1.59</td>
<td>0.45</td>
<td>0.72</td>
<td>0.19</td>
<td>0.78</td>
</tr>
<tr>
<td>Minimum monthly return</td>
<td>−8.5%</td>
<td>−14.46%</td>
<td>−3.66%</td>
<td>−13.32%</td>
<td>−4.19%</td>
</tr>
</tbody>
</table>

Source: www.hedgefundresearch.com and CISDM.

distressed securities display negative skewness and high kurtosis (see Exhibit 8-37), however, risk represented by standard deviation is probably understated.

In terms of performance, this strategy depends a great deal on the business cycle and how well the economy is doing. When the economy is not doing well, bankruptcies increase and this strategy does well. An important risk factor that may not be captured by the performance data is event risk. The ability to correctly predict whether an event will occur will ensure the success of the strategy.

8.2.3. Interpretation Issues

In estimating the size of the distressed debt market, we gave figures for the high-yield debt market. Non-investment-grade or high-yield bonds are not necessarily on the brink of default; thus, they are not necessarily distressed. Distressed bonds constitute the highest credit-risk segment of the high-yield bond market. Furthermore, distressed securities include distressed equities and strategies based on these instruments.

8.3. Distressed Securities: Investment Characteristics and Roles

Although certain types of distressed securities investing may be considered for risk-diversification potential, some of its typical risks are not well captured by such measures as correlation and standard deviation, which are usually the guideposts in portfolio optimization. Investors look to distressed securities investing primarily for the possibility of high returns from security selection (exploiting mispricing), activism, and other factors.

8.3.1. Investment Characteristics

The market opportunity that distressed securities investing offers to some investors arises from the problems that corporate distress poses to other investors. Many investors are barred either by regulations or by their investment policy statements from any substantial holdings in below-investment-grade debt. These investors must sell debt that has crossed the threshold from investment grade to high yield (so-called fallen angels). Banks and trade creditors may prefer to convert their claims to cash rather than participate as creditors in a possibly long reorganization process. Failed leveraged buyouts have also been a source of distressed securities opportunities. The impetus of some investors to off-load distressed debt creates opportunities for bargain hunters.

Old equity claims may be wiped out in a reorganization, replaced by new shares issued to creditors, and sold to the public as the company emerges from reorganization. These

---

138Distressed debt has sometimes been defined arbitrarily as bonds trading at spreads of 1,000 bps or more above government bonds. See Yago and Trimbath (2003).
139See Anson (2002b) for a detailed discussion of leveraged buyouts and this type of opportunity.
shares may be shunned by investors and analysts, and thus be mispriced. Distressed securities may offer a fertile ground for experts in credit analysis, turnarounds, business valuation, and bankruptcy proceedings to earn returns based on their skill and experience.\footnote{140}

A common theme in distressed securities investing is that it often demands access to specialist skills and deep experience in credit analysis and business valuation. Distressed companies are potentially near the end of their life as going concerns. The investor needs to assess not only potential outcomes for the company as a going concern but also the bare-bones liquidation value of the company. The investor needs to understand the sources of the company’s problems, its core business, and its financing structure. A distressed securities fund’s abilities in this regard are one element in due diligence.

For a private or institutional investor investing indirectly via a hedge fund or other vehicle, this type of investment inherits the liquidity characteristics specified in the structure of the vehicle. Discussion of the types of risk involved in distressed securities investing follows an overview of strategies in the next section.

8.3.2. Roles in the Portfolio  According to the 2005 Commonfund Benchmarks Study of U.S. educational endowments, overall allocation to distressed debt among the institutions surveyed was 5 percent for the year ended June 30, 2005.\footnote{141} Investors, private and institutional, are making substantial allocations to this alternative investment and need to understand the ranges of distressed securities strategies available and their risk characteristics.

From the perspective of the direct investor in distressed securities, there are a number of different strategies that may be adopted. As we discuss them, the reader should be aware that the hedge fund and private equity businesses and benchmark vendors use a variety of classifications and some differences in definition. The aim here is to convey the gist of what the various approaches involve.

8.3.2.1. Long-Only Value Investing  The simplest approach involves investing in perceived undervalued distressed securities in the expectation that they will rise in value as other investors see the distressed company’s prospects improve. When the distressed securities are public debt, this approach is high-yield investing. When the securities are orphan equities, this approach is orphan equities investing.

8.3.2.2. Distressed Debt Arbitrage  Distressed debt arbitrage (or distressed arbitrage) involves purchasing the traded bonds of bankrupt companies and selling the common equity short. The hedge fund manager attempts to buy the debt at steep discounts. If the company’s prospects worsen, the value of the company’s debt and equity should decline, but the hedge fund manager hopes that the equity, in which the fund has a short position, will decline to a greater degree. Indeed, as a residual claim, the value of equity may be wiped out. If the company’s prospects improve, the portfolio manager hopes that debt will appreciate at a higher rate than the equity because the initial benefits to a credit improvement accrue to bonds as the senior claim. Typically, the company will have already suspended any dividends, but debtholders will receive accrued interest. This approach has been popular with hedge funds.

\footnote{140}{In fact, according to a study published by New York University’s Salomon Center and the Georgetown School of Business, newly distributed stocks emanating from Chapter 11 proceedings during the 1980 to 1993 period outperformed the relevant market indices by more than 20 percent during their first 200 days of trading.}

\footnote{141}{See Jacobius (2006b), pp. 3, 40.}
8.3.2.3. Private Equity  This has also been called an “active” approach because it involves corporate activism. It has, in fact, a number of variations. The investor usually first becomes a major creditor of the target company to obtain influence on the board of directors or, if the company is already in reorganization or liquidation, on the creditor committee. The investor buys the debt at deep discounts. The investor then influences and assists in the recovery or reorganization process. The objective of this focused active involvement is to increase the value of the troubled company by deploying the company’s assets more efficiently than in the past. If the investor obtains new shares in the company as part of the reorganization, the investor hopes to sell them subsequently at a profit.

A variation of the active approach is converting distressed debt to private equity in a prepackaged bankruptcy. This type of operation is typically conducted by private equity firms. The firm (or team of firms, because the capital commitment may be major) takes a dominant position in the distressed debt of a public company. Working with the company and other creditors, the firm seeks to have a prepackaged bankruptcy in which the firm becomes the majority owner of a private company on favorable terms (the previous public equityholders losing their complete stake in the company). After restoring the company to better health, the firm has a company that can be sold to private or public investors. An example discussed by Anson is the conversion in 2001 of Loews Cineplex Entertainment Corporation from a public to a private company by two buyout firms (the buyout firms subsequently sold their interest, and as of 2005, Loews is still a private company).

Distressed securities investors following an active approach will be quite proactive or aggressive in protecting and increasing the value of their claims. Practitioners of the private equity approach are often referred to as vulture investors, and their funds as vulture funds or vulture capital. Nevertheless, if the company is turned around, other parties may benefit, and the vultures are bearing risk that presumably other investors wish to transfer to them.

EXAMPLE 8-14  Turnaround Partners

Often, distressed securities investors solicit the help of experienced executives to manage the troubled companies. In the case of the WorldCom/MCI bankruptcy, one such investor was quoted in the *Wall Street Journal*, when the investor urged Michael D. Capellas, the former chairman and CEO of Compaq Corporation, to join Worldcom Inc., as saying, “You run the business and we’ll run the bankruptcy process.”

Investors need to assess the risks that a particular distressed securities strategy may entail. The risks may include one or more of the following:

- **Event risk.** Any number of unexpected company-specific or situation-specific risks may affect the prospects for a distressed securities investment. Because the event risk

142 The term prepackaged bankruptcy refers to the case in which the debtor seeks agreement from creditors on the terms of a reorganization before filing formally for a Chapter 11 reorganization. More details are given later.

143 See Anson (2002b). Another operation Anson discusses is private equity firms making a cash bid for the assets of a company in reorganization at a discount to perceived value.

144 See Branch and Ray (2002).

in this context is company specific, it has a low correlation with the general stock market.

- **Market liquidity risk.** Market liquidity in distressed securities is significantly less than for other securities, although the liquidity has improved in recent years. Also, market liquidity, dictated by supply and demand for such securities, can be highly cyclical in nature. This is a major risk in distressed securities investing.

- **Market risk.** The economy, interest rates, and the state of equity markets are not as important as the liquidity risks.

- **J factor risk.** Barnhill, Maxwell, and Shenkman (1999) referred to the judge’s track record in adjudicating bankruptcies and restructuring as "J factor risk." The judge’s involvement in the proceedings and the judgments will decide the investment outcome of investing in bankruptcy. Branch and Ray (2002) noted that the judge factor is also an important variable in determining which securities, debt or equity, of a Chapter 11–protected company to invest in.

Other risks may also be present. Some are associated with the legal proceedings of a reorganization: The actions of the trustees as well as the identity of creditors can affect the investment outcome. The distressed securities investor may lack information about the other investors and their motivations. Tax issues may arise in reorganizations.146

A normality assumption is not appropriate in evaluating this class of strategies. It has become quite well known that the return distribution from this strategy is not normally distributed (it has negative skewness and positive kurtosis); thus, if normal distribution is assumed, risk measurement tends to underestimate the likelihood of downside returns.

Distressed securities are illiquid and almost nonmarketable at the time of purchase. As the companies turn around, values of the distressed securities may go up gradually. Typically, it takes a relatively long time for this strategy to play out; thus, valuing the holdings may be a problem. It is difficult to estimate the true market values of the distressed securities, and stale pricing is inevitable. Stale valuation makes the distressed securities appear less risky. The risk of this strategy is probably understated, and its Sharpe ratio overstated.

Whether a distressed securities investment will be successful or not depends on many factors. The outcome depends heavily on the legal process and may take years. Of course, the vulture investor’s timeframe is often months, not years. The role played by vulture investors has a significant bearing on the outcome. If vulture investors do not participate in the restructuring (as in the case of MCI, where two of the vulture investors named to the board declined to take board seats) or if they decide to sell prior to the final settlement, the flood of shares into the market will create further downward pressure on the stock price. This may have a significant impact on the whole industry. Because any move by vulture investors may be heeded by other investors, they take great care not to divulge their intentions.

Thus, investing in distressed securities/bankruptcies requires legal, operational, and financial analysis. From an investment perspective, the relevant analysis involves an evaluation of the source of distress. The source could be the operations, finances, or both. This is a complex task, and each distressed situation requires a unique approach and solution. As a result, distressed investing involves company selection. In this chapter, we focus on the legal aspects.

### 8.3.3. Other Issues

In this section, we describe the bankruptcy process to highlight how the process may affect the investment outcome and considerations that investors need to ponder.

---

146See Branch and Ray (2002) and Feder and Lagrange (2002) for more information.
8.3.3.1. Bankruptcy in the United States vs. Other Countries

For all practical purposes, the relevant legislation for distressed investment in the United States is the Bankruptcy Reform Act of 1978, which applies to all bankruptcies filed since 1 October 1979. This enactment is referred to as “The Bankruptcy Code,” or “United States Code” (Branch and Ray, 2002). In the Code, there are several chapters of the substantive law of bankruptcy. Chapters 1, 3, and 5 generally apply to all cases, whereas Chapters 7, 9, 11, 12, and 13 provide specific treatment for particular types of cases. Of particular interest to distressed securities investors are Chapters 7 and 11, which provide specific treatments for, respectively, liquidations and reorganizations.

Branch and Ray pointed out that a U.S. Chapter 7 bankruptcy is conceptually similar to the bankruptcy procedures followed in most other countries. That is, when a person seeks protection under Chapter 7, that person’s assets are collected and liquidated and the proceeds are distributed to creditors by an appointed bankruptcy trustee. The debtor is normally discharged from the debts that were incurred prior to bankruptcy. As in most other countries, under Chapter 7, rehabilitation of the debtor is not especially important. It is in this sense that the U.S. Chapter 7 is conceptually similar to other countries.

In contrast, Chapter 11 emphasizes rehabilitation of the debtor and provides an opportunity for the reorganization (restructuring) of the debtor. This is the distinctive feature of U.S. bankruptcy that separates it from most of the rest of the world (although a similar code exists in Canada called the Companies’ Creditors Arrangement Act, or CCAA). This is where opportunity arises for distressed debt investors. In Chapter 11, the debtor (a business seeking relief and protection) retains control of its assets (which will immediately pass into a bankruptcy estate under the supervision of the court) and continues its operations. While under this protection, the debtor, now known as a “debtor-in-possession,” seeks to pay off creditors (often at a discount) over a period of time according to a plan approved by the bankruptcy court. Some of the liabilities may be discharged. By filing Chapter 11, a debtor can protect its productive assets from being seized by creditors and have time to plan the turnaround of the business.

A Chapter 11 case can be initiated voluntarily by a debtor or involuntarily by certain of the debtor’s creditors or their indenture trustee. The indenture trustee—typically a bank, trust company, or other secure, respected institution—is named in the indenture agreement (contract between bondholders and the bond issuer) as the bondholders’ agent charged with enforcing the terms of the indenture.

A plan of reorganization is submitted to the court for approval. The plan is typically proposed by the debtor with the blessings of creditors, especially the senior creditors. In most cases, the debtor works with its creditors to formulate a plan of reorganization. This plan details how much and over what period of time the creditors will be paid. Prospective distressed securities investors should pay attention to the exclusivity period. The exclusivity period occurs at the beginning of each case. During this time (set at 120 days but often extended by the court), only the debtor can file a plan of reorganization. After the exclusivity period expires, any party with an interest in the bankruptcy can file a plan proposing how the estate’s creditors are to be paid under Chapter 11. Creditors and shareholders of the debtor eventually must approve the plan and have it confirmed by the bankruptcy judge.

We do not intend to provide a complete treatment of the bankruptcy process but instead to provide an overview of the process so that investors can recognize the complexities involved and make intelligent investment decisions without being confused by the legal technicalities. For a detailed treatment, see Branch and Ray (2002).
can refuse to confirm a case if the plan is not proposed in good faith or if each creditor receives less than it would receive in a Chapter 7 liquidation. The judge can overrule the disapproval by some dissenting creditors, however, on economic grounds or for other considerations, such as social or legal grounds. This is commonly referred to as the cram-down. Thus, a cram-down is basically a compromise between the debtor and certain classes of creditors when they cannot come to an agreement on the reorganization plan. Referred to as the “impaired class,” those who object to the reorganization plan are those who believe their interest in the reorganization is impaired by the proposed plan.

Put another way, an approved reorganization plan by the court of law may not necessarily make economic sense, and such an erroneous presumption may be costly to distressed investing. The uncertain nature of the outcome of legal proceedings makes analysis of such investment challenging, and it must be accompanied by extensive due diligence.

8.3.3.2. Absolute Priority Rule In the United States, a reorganization plan must follow the rule of priority with respect to the order of claims by its security holders. In general, claims from senior secured debtholders (typically, bank loans) will be satisfied first. The debtor’s bondholders come next. The distribution may be split between senior and subordinated bondholders. Last on the list are the debtor’s shareholders.

In a cram-down in which the court overrules the objection of a dissenting class of creditors, the priority rule becomes absolute. The rule is absolute in the sense that, to be “fair and equitable” to a class of dissenting unsecured creditors, the plan must provide either that the unsecured creditors receive property of a value equal to the allowed amount of the claim or that the holder of any claim or interest junior to the dissenting class does not receive or retain any property on account of the junior claim. In other words, the classes ranked below the dissenting unsecured class must receive nothing if the dissenting class is to be crammed down. It is in this sense that the law treats the holders of claims or interest with similar legal rights fairly and equitably, even if they do not accept the proposed plan.

There is an exception to the absolute priority rule, which is referred to as the new value exception. In the new value exception, the debtor’s shareholders seek to retain all or a portion of their equity interest by making what amounts to a capital contribution. In exchange for their contribution, they retain their interest even in the face of a dissenting vote by a senior class of creditors. The U.S. Supreme Court has held, however, that the new value exception does not permit contribution of such value without competitive bidding or some other mechanism to establish the adequacy of the contribution. Branch and Ray (2002) concluded that this ruling removes substantial uncertainty over whether or not a lower class of creditors can receive distribution under a plan of reorganization by contributing new value to the bankruptcy confirmation process. In other words, it helps reduce uncertainty in purchasing an interest in a Chapter 11 debtor.

Most of the time, holders of senior secured debts are “made whole” whereas the debtor’s shareholders often receive nothing on their original equity capital. This is the residual risk that equity shareholders ultimately must bear.

8.3.3.3. Relationship between Chapter 7 and Chapter 11 Why must distressed investors pay attention to Chapter 7 filings? Chapter 11 reorganization can start from a
Chapter 7 filing, whether voluntarily or involuntarily. A debtor against whom an involuntary Chapter 7 is filed has a right to convert the case to a Chapter 11 proceeding. Similarly, a Chapter 7 debtor that filed a voluntary petition can convert the case to a Chapter 11, unless the case started as a Chapter 11. In addition, the court can convert a Chapter 11 case to Chapter 7 or dismiss the case for cause (e.g., the inability of the debtor to carry out a plan) at any point in the case. The latter uncertainty adds much risk to bankruptcy investors.

8.3.3.4. Prepackaged Bankruptcy Filing  In a prepackaged bankruptcy filing, the debtor agrees in advance with its creditors on a plan or reorganization before it formally files for protection under Chapter 11. Creditors usually agree to make concessions in return for equity in the reorganized company. This is tantamount to obtaining advance approval of an exchange offer of public debt with less stringent requirements than those found in the public indenture. This way, a debtor expedites the bankruptcy process to emerge as a new organization.

Whether it is Chapter 7 or Chapter 11, a filing for protection under law will affect the value of the debtor. Especially under forced bankruptcy (i.e., involuntary Chapter 7 filing by creditors), its reputation is severely impaired by the stigma of being forced into bankruptcy.

EXAMPLE 8-15 Distressed Securities Investing

Gloria Richardson is CIO of a multibillion-dollar home office for the Nelson family. She is discussing the revision of the governing investment policy statement to permit the investment in distressed securities. Susan Nelson represents the family in policy matters.

Nelson states: “Distressed securities sound like a very-high-risk investment strategy because the strategy focuses on companies in bankruptcy. Is that why few investors choose to invest in distressed securities? What are the origins of distressed securities, and how are investors involved? Who researches these situations?”

1. Discuss the suitability of investing in distressed securities for buy-side (institutional) investors and evaluate the participation of sell-side analysts in researching distressed securities.

Nelson is still concerned about the downside risk of investing in distressed securities. Nelson states: “I’m a patient investor, and I want our family’s philanthropic contributions to extend into perpetuity, but it seems that the strategy of investing in distressed securities has higher risk in every aspect than investing in traditional equities and bonds.”

2. Judge the suitability of investing in distressed securities for the home office. Justify your response with reference to time horizon and Nelson’s statement regarding risk.

Solution to Problem 1: Some buy-side investors, such as pension plans, cannot or may choose not to hold below-investment-grade securities because of the securities’ relatively high risk in comparison with other asset classes. However, results suggest that institutional investors with higher risk tolerances and long time horizons may receive stable returns from distressed securities with relatively low risk in the long run.

As a result of the inability of some institutional investors to allocate funds to distressed securities, few sell-side analysts cover this area of the market. Given
this limited following of distressed securities, undercovered and undervalued market opportunities exist that knowledgeable investors can exploit to earn high returns.

**Solution to Problem 2:** Given Nelson’s statement, investing in distressed securities could provide a potentially attractive strategy for the family’s home office. Because the investment time horizon is long term, there should be no inherent obstacle regarding the amount of time it may take for a distressed securities investment to work out. Additionally, Nelson is incorrect in stating that distressed securities are riskier than traditional asset classes in all respects. Although long-term returns for distressed securities show negative monthly returns for 20 percent of all months studied, the maximum 1-month and 12-month drawdowns are smaller for distressed securities than for U.S. and world equities and bonds. If Nelson understands and accepts these risks, such investments may be appropriate.