UpperMark™ Study Handbook

CAIA® Level I

Volume 3

Topic 6: Hedge Funds

Topic 7: Digital Assets

UpperMark™

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It is recommended that candidates use any exam preparation product together with the original CAIA curriculum readings.[1]

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Preface

Volume 3 of the UpperMark™ *Study Handbooks* provides a comprehensive and concise account of each learning objective (L.O.) in Topics 6-7 of the CAIA Level I curriculum. The *Study Handbook* is compiled using the reference materials recommended by the CAIA Association and, as in Volume 1, is organized as follows.

- Each Reading in curriculum is presented as a separate chapter, keywords are indicated in ***bold italics***, and learning objective sub-bullets are indicated by underlined, capitalized subheadings (e.g., ROLE OF INVESTMENT OBJECTIVES AND CONSTRAINTS).
- The lists of learning objectives and keywords are provided at the start of each chapter.
- Space is provided at the end of each chapter for you to record your *Personal Study Notes*.
- A set of sample exam questions with a detailed answer key is presented at the end of each chapter.

Supplementary information is included in footnotes.

The CAIA Equation Exception List is provided in Appendix 2. Further, as in Volume 1, the first occurrence of each equation on this list is followed by a (***G***) in this Handbook to indicate that the equation will be *given* on the exam.

We wish you the best with your exam preparation.

Padideh Jalali, Ph.D., CAIA
President and CEO
UpperMark, Inc.

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Topic 6

Hedge Funds

Topic 6 is composed of five Readings on hedge funds.

1. Reading 6.1 is an introductory reading that provides an overview of the hedge industry and several hedge fund strategies.

   The remaining Readings each focuses on a specific hedge fund strategy.

2. Reading 6.2 covers the macro hedge fund strategy and managed futures funds.
3. Reading 6.3 covers event-driven hedge fund strategies.
4. Reading 6.4 covers relative value hedge fund strategies.
5. Reading 6.5 covers equity hedge fund strategies.

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Reading 6.1

The Hedge Fund Industry

This Reading provides an overview of the hedge fund industry, reviewing its growth and consolidation. The Reading discusses distinguishing characteristics of hedge funds and introduces several types of hedge fund strategies. The Reading also reviews the short selling process, describes arbitrage-free models, describes the process of designing a hedge fund program, and discusses components of hedge fund indices.

Learning Objectives

6.1.1 Demonstrate knowledge of the distinguishing features of hedge funds and their growth and concentration over time as well as various types of hedge funds.

i. Describe the primary elements of hedge funds
ii. Summarize the investment flexibilities offered by hedge funds
iii. Discuss the reasons for hedge fund industry growth and concentration
iv. List hedge fund strategies
v. Contrast single-manager hedge funds, funds of funds, and multistrategy funds

Keywords

1. Fund mortality
2. Multistrategy fund
3. Safe harbor

6.1.2 Demonstrate knowledge of short-selling processes and mechanics.

i. Explain the mechanics of institutional short-selling
ii. Explain the mechanics of short-selling to the short-seller
iii. Calculate the total return of a short position
iv. Understand special situations involving short-selling

Keywords

1. Bought in
4. Dividend irrelevancy
5. General collateral stocks
6. Rebate
7. Short selling
8. Short squeeze
9. Special stock
10. Substitute dividends

v. Explain the term structure of implied forward rates

6.1.3 Demonstrate knowledge of arbitrage-free financial models.

i. Describe arbitrage-free models
ii. State a key externality of arbitrage activities
iii. Discuss applications of arbitrage-free models
iv. Describe arbitrage-free pricing in spot markets
v. Describe hedged and unhedged carry trades

Keywords

1. Absolute pricing model
2. Arbitrage
3. Arbitrage-free model
4. Cash market
5. Relative pricing model
6. Spot market

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6.1.4 Demonstrate knowledge of hedge fund returns and asset allocation.

i. Discuss the process of analyzing a hedge fund program
ii. Identify strategies grouped by systemic risk
iii. Discuss equity strategies in hedge funds
iv. Discuss event-driven and relative value strategies in hedge funds
v. Discuss event risk and volatility strategies in hedge funds
vi. Discuss event risk and insurance-type strategies in hedge funds
vii. Discuss absolute return strategies in hedge funds
viii. Discuss diversified fund strategies in hedge funds

Keywords

1. Absolute return strategies
2. Convergent strategies
3. Diversified strategies
4. Equity strategies
5. Event-driven strategies
6. Off-balance-sheet risk
7. Relative return product
8. Relative value strategies
9. Short volatility exposure

6.1.5 Demonstrate knowledge of investing in multistrategy funds.

i. Evaluate fee-related advantages of multistrategy funds
ii. Evaluate flexibility and transparency in the context of multistrategy funds
iii. Evaluate potential advantages related to manager selection and operational risk management by funds of funds

Keyword

1. Fee netting

6.1.6 Demonstrate knowledge of research studies on hedge funds.

i. Discuss the evidence regarding findings on hedge fund performance
ii. Discuss the evidence regarding the market impact of hedge funds during the Asian currency crisis of 1997
iii. Discuss the evidence regarding the market impact of quantitative hedge funds during the crisis of 2007

Keyword

1. Headline risk

6.1.7 Demonstrate knowledge of hedge fund indices.

i. Describe hedge fund indices
ii. Understand the structure of management and incentive fees on hedge fund indices
iii. Contrast asset weighted hedge fund indices and equally weighted hedge fund indices
iv. Understand representativeness and data biases in hedge funds
v. Understand and apply strategy definition and style drift
vi. Discuss index investability of hedge funds

Keywords

1. Fee bias
2. Instant history bias or backfill bias
3. Investability
4. Liquidation bias
5. Participation bias
6. Representativeness
7. Style drift
8. Synthetic hedge funds

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L.O. 6.1.1 **DEMONSTRATE KNOWLEDGE OF THE DISTINGUISHING FEATURES OF HEDGE FUNDS AND THEIR GROWTH AND CONCENTRATION OVER TIME.**

The first hedge fund was established by Alfred Winslow Jones in 1949. The A.W. Jones & Co. hedge fund took long and short positions in U.S. stocks with the intention of limiting market risk while focusing on stock selection. An article published in *Fortune* magazine in 1966 highlighted Alfred Jones, which then spurred interest in his product. Within two years, the number of hedge funds in the U.S. had increased to 140. The bear market in the early 1970s witnessed the demise of many hedge funds, and interest in the industry was not renewed until late 1980s, with growth attributed in part to investors appreciating HFs' ability to manage bear markets and overcome crises better than traditional long-only strategies. The number of hedge funds grew considerably during the 1990s, and, by 2025, there were about 9,500 hedge funds with over $5.2 trillion in total assets. In contrast, mutual funds, money market funds, and exchanged-traded funds had over $45 trillion in total assets in 2025.

The ability to short assets contributed significantly to capital markets. Hedge funds generated returns on both long and short investments and provided institutional investors benefits such as diversification in their asset allocation with new approaches to portfolio construction, portfolio management, risk management, and risk mitigation. The hedge fund industry introduced a new set of skills to traditional managers.

PRIMARY ELEMENTS OF HEDGE FUNDS

A hedge fund is an investment pool or vehicle with the following characteristics.

1. Privately organized
   - Hedge funds are generally privately organized and unlisted investment vehicles that use pooled resources of institutional and other qualified investors to invest in securities and derivative instruments.
   - Hedge funds provide investment opportunities that are not available through traditional, regulated investment pools or are more easily or cost-effectively executed.
2. Performance-based fees
   - In addition to asset-based management fees, hedge funds typically charge incentive-based fees to attract and motivate top-performing financial professionals who are skilled at implementing sophisticated trading strategies and providing investment opportunities distinct from those available with traditional investments.
   - The fees are intended to align the interests of managers and fund investors.
   - Managers' compensation can alter the nature of an investment, including its risks and returns and potential alignment between limited and general partners.
3. Leverage, derivatives, short, structured products, and concentrated
   - Hedge funds can apply leverage, actively trade derivatives, establish short positions, invest in structured products, and hold relatively concentrated positions.
4. Subject to fewer regulations than its traditional counterparts, which generally enables an unconstrained investment strategy and investment universe (i.e., can invest in any public or private securities).
   - Hedge funds are typically less regulated than public investment vehicles. However, in some jurisdictions, a hedge fund's management company needs to be registered in the same way

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as a mutual fund's management company.

- ➢ While this discussion focuses on hedge funds intended for institutional investors, as regulation evolves, hedge funds are creating vehicles and strategies suitable for retail investors.

- They are exempt from certain regulatory requirements if they qualify under a ***safe harbor***, which is a regulatory provision that protects investments from regulations. For instance, in the U.S., hedge funds that are not advertised or offered to the general public are exempt from disclosure requirements under the U.S. 1940 Investment Company Act.

INVESTMENT FLEXIBILITIES OFFERED BY HEDGE FUNDS

Hedge funds use investment flexibilities that are not typically available to traditional mutual funds.

1. Nonpublic, unlisted securities
   - Hedge fund strategies can invest in nonpublic (i.e., issued without a prospectus and a public offering), unlisted (i.e., not publicly traded) securities.
2. Significant leverage
   - Hedge funds often use large amounts of leverage; significantly more than mutual funds, which, in the U.S., are limited to borrowing at most 33% of their net asset base.
   - Some hedge fund strategies use leverage up to 10 times their net asset base (at the extreme, up to 100 times their net asset base).
3. Derivative securities
   - Hedge funds tend to use derivatives more often than mutual funds. Derivatives often result in nonlinear cash flows, which need more advanced risk management and can increase fund leverage and add new risks.
4. Short positions
   - Hedge funds take short positions in public securities to increase return or reduce risk. This is one of the key differences between hedge funds and most traditional funds that are tied to long-only positions.
   - Shorting securities and use of derivatives can also increase the fund's implicit leverage.
5. Riskier investments
   - Hedge funds tend to trade in riskier investments (e.g., structured assets and digital assets).
6. More actively managed
   - Hedge funds are generally more actively managed, with more complex strategies and dynamic risk exposures, than traditional funds that typically have benchmark-linked performance.

Some hedge funds have only one or two of these characteristics. However, hedge funds are a legal structure, not a single strategy that can be clearly distinguished from other investments. In fact, as alternatives have evolved, the lines between hedge funds and other alternative investments have blurred.

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Some of the differences between hedge funds and mutual funds are listed in the table below.

<table>
<tr><th></th><th>Hedge Funds</th><th>Mutual Funds</th></tr>
<tr><td>Manager registration</td><td>Required</td><td>Required</td></tr>
<tr><td>Offering method (Documentation)</td><td rowspan="2">Voluntary – flexible</td><td rowspan="2">Established – detailed</td></tr>
<tr><td>Disclosure requirements</td></tr>
<tr><td>Investment strategies available</td><td rowspan="4">Unrestricted</td><td rowspan="4">Restricted</td></tr>
<tr><td>Concentration limits</td></tr>
<tr><td>Use of leverage</td></tr>
<tr><td>Use of derivatives</td></tr>
<tr><td>Permissible investors</td><td>Restricted
(Accredited only)</td><td>Unrestricted</td></tr>
</table>

Given that hedge funds have few restrictions, they are available for limited distribution to accredited investors or qualified purchasers, who regulators believe can appropriately assess the risks associated with hedge funds. In contrast, the restrictions on mutual funds enable them to distribute their shares to the general public.

REASONS FOR HEDGE FUND INDUSTRY GROWTH AND CONCENTRATION

There are several reasons for the interest in hedge funds.

1. Hedge funds' potential to serve as diversifiers due to low correlations with traditional asset returns.
   - Bear markets spur interest for investors who suffered losses in their traditional stock and bond portfolios.
2. Hedge funds' investment mandate flexibility in being able to take both long and short positions.
3. Attractive risk-adjusted returns

After the financial crisis began in 2007, the industry suffered significant decline in both AUM and number of funds, as hedge funds began to yield negative returns and experience the first net asset outflows since 1994. Hedge Fund Research (HFR) Inc., a firm specializing in indexation and analysis of hedge funds, estimates that, from the end of 2007 to the end of 2009, hedge fund assets declined by 25%, as fund losses totaled $176 billion and investors withdrew an additional $285 billion.

The growth and decline in the hedge fund industry are also apparent in Figure 1.

- Each year from 1996 to 2007, new hedge funds were launched.
- 2008 and 2009 experienced significant net attrition.
- From 2009 to 2014, the number of hedge funds grew (with more funds being launched than liquidated).

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- The period beginning 2015 witnessed net attrition as absolute performance was challenging relative to strong beta markets.

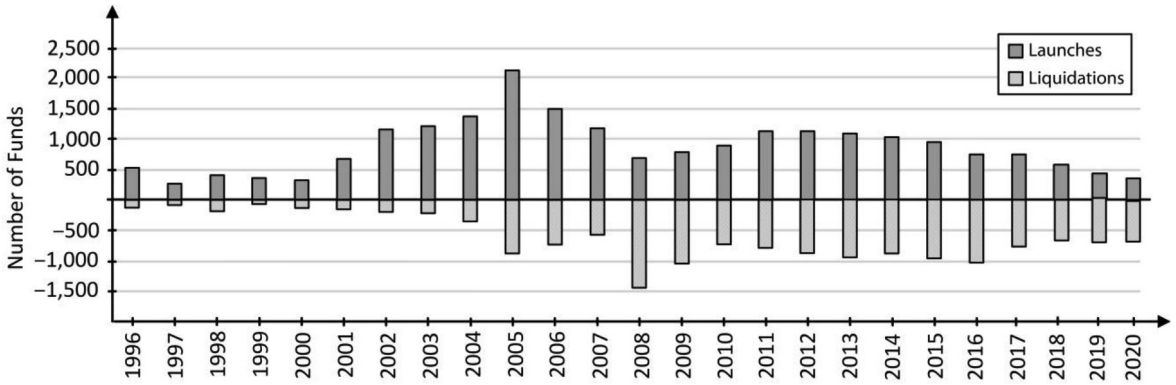


Figure 1: Estimated Number of Funds Launched and Liquidated (1996-2020)

After the 2008 financial crisis, the hedge fund industry experienced significant concentration or consolidation (i.e., higher proportion of industry represented by smaller number of participants). This was a result of a number of factors.

- The financial crisis resulted in numerous hedge fund frauds and liquidations and, as a result, institutional investors began to pursue larger hedge funds, considering them less risky.
- The expense associated with facilitating due diligence performed by prospective hedge fund investors. Larger hedge funds can more easily afford this expense.

About 25% of hedge fund management firms managed more than $1 billion and more than 90% of industry assets; leaving 7% of the industry's assets for about 7,000 hedge funds.

SINGLE-MANAGER HEDGE FUNDS, FUNDS OF FUNDS, & MULTI-STRATEGY FUNDS

The hedge fund industry is composed of single-manager hedge funds and funds of hedge funds.

- A single-manager hedge fund (or single hedge fund) invests in securities and/or derivative instruments.
  - A single hedge fund may be a ***multi-strategy fund*** (i.e., hedge fund that invests in different strategies and with different sub-managers who are part of the same organization).
  - A multi-strategy fund has one layer of fees paid to the fund's manager.
- A fund of funds (FoF) is a hedge fund that invests in other hedge funds.
  - The hedge funds in an FoF have independent managers.
  - An FoF has two layers of fees. Investors pay fees to the FoF manager and they essentially pay fees to the managers of the hedge funds in which the FoF invests.

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HEDGE FUND STRATEGIES

Hedge funds are largely differentiated from one another by their trading strategies, which are often organized into a classification of hedge fund strategies. There are different ways to classify hedge funds. The CAIA curriculum classifies them into four groups as presented in Table 1.

Macro and Managed Futures	Event-driven	Relative Value	Equity
1. Macro 2. Managed Futures	1. Activists 2. Merger Arbitrage 3. Distressed 4. Event-Driven Multi-Strategy	1. Convertible Bond Arbitrage 2. Volatility Arbitrage 3. Fixed-Income Arbitrage 4. Relative Value Arbitrage Multi-Strategy	1. Long/Short 2. Market Neutral 3. Short Selling

Table 1: CAIA Classification of Hedge Fund Strategies

Analogies can be drawn between investing in hedge funds and investing in traditional assets.

- Investing in a single hedge fund manager is analogous to investing in a single stock. They both expose investors to idiosyncratic risks related to the hedge fund or issuing company and, thus, to substantial dispersion in returns.
- Investing in a multi-strategy hedge fund is analogous to investing in the stock of a conglomerate rather than the stock of a firm focused on one line of business.
- Investing in an FoF is analogous to investing in a mutual fund. They both aim to diversify risk. Since FoFs invest across managers and strategies and mutual funds invest across stocks, a loss with one manager or stock will likely be offset by gains by other managers/stocks. These investments result in returns that are less dispersed than a single hedge fund/stock investment.

The risk of investing in individual hedge funds is apparent in the rate of ***fund mortality*** (i.e., liquidation or termination of operations by funds). This is depicted in Figure 1: more than 17,000 hedge funds have liquidated since 1996, including over 15,000 that liquidated since 2006. These figures are likely understated for the industry, since they only reflect hedge fund liquidations tracked by the HFR database. HFR estimated that, in 2025, about 80% of hedge funds were more than five years old, 10% less than three years old, and 10% between three and five years old. Analysis of hedge fund performance should also consider survivorship bias.

L.O. 6.1.2 **DEMONSTRATE KNOWLEDGE OF SHORT-SELLING PROCESSES AND MECHANICS.**

Market participants who believe that a stock price will decline may earn positive returns by short selling the stock. ***Short selling*** financial assets involves borrowing securities from a securities lender, selling the securities at market price, and later purchasing identical securities in the market (hopefully at a lower price) to repay the loan from the securities lender. Short selling is a key part of many hedge fund strategies.

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In contrast to long positions that have limited loss potential (since a stock price has a lower limit of zero) and unlimited profit potential (since theoretically a stock price has no upper limit), short positions have an unattractive profile of unlimited loss potential (due to no upper limit to a stock price) and limited profit potential (due to a stock price's lower limit of zero). For example, buying a $50 stock can result in a maximum loss of $50 if the stock price falls to zero; however, shorting the stock can theoretically result in unlimited loss since the stock price can theoretically increase without bound. Therefore, short selling requires special skills and risk management techniques.

MECHANICS OF INSTITUTIONAL SHORT-SELLING

Owners of stocks often leave their stock certificates with their brokerage firms for safekeeping, and the stocks are typically held in the broker's street name (i.e., legal ownership of customer securities held in the brokerage firm's name on behalf of customers). The brokerage firms often lend the securities to short sellers to generate income, and the short sellers sell them in the market, and the new owners of the shares deposit them in their brokerage firms.

- For instance, if a speculator expects the stock price of company XYZ to decline, he may place an order to short sell XYZ shares through his brokerage firm, which lends him the shares or first borrows them from another financial institution and then lends them.[1] Although new shares are not created, the pool of owners expands via borrowing and reselling of the shares.
- If XYZ distributes a dividend, it pays it to the current owners of record for the shares (not the previous shareholders who lent their securities). Therefore, while the stock loan is outstanding, the securities borrower must compensate the securities lender for the "lost" dividends paid by XYZ. This compensation is referred to as ***substitute dividends***, and is a cost to the short seller and affects his total return.

In time, the speculator closes his short positions by purchasing the stock in the open market and returning the shares to the lender. Since a stock price has a lower limit of zero, short sellers' maximum return is 100%.

MECHANICS OF SHORT-SELLING TO THE SHORT SELLER

The first step to short selling involves finding the shares to borrow. Once a short seller finds and borrows shares from a brokerage firm, he sells them in the open market, and collects the shares' market price less commission. The borrower then posts the sales proceeds plus a margin (also referred to as a haircut; typically 2% for institutional investors) with the broker dealer to protect the broker in case the borrowed stock price rises. Since short sellers are a liability to brokers, the posting provides the broker with assets to re-purchase the borrowed stock, if necessary, to close out the loan.

The broker, as an intermediary, must also provide cash collateral to the original securities lender, who typically invests the cash and earns interest on it.

- For stocks with a large pool of lenders and many shares available to borrow, the securities lender typically pays the broker part of the interest earned on the collateral. The interest paid to the broker is referred to as a ***rebate***, which is typically slightly less than current short-term interest rates.[2]
  - ➢ The goal of the broker is to earn a spread between the interest earned on the collateral and the rebate paid to the securities borrower. The compensation to the lender is a cost to the borrower.

[1] Stocks loaned by a brokerage firm come from the firm's own inventory, the margin account of the firm's other clients, or another lender.

[2] Rebates are typically only available to large clients (e.g., institutional investors), not to retail investors.

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  - The securities lender is exposed to the risk that the borrower will default and be unable to return the shares when the stock price rises and the collateral is insufficient to repurchase the shares in the market.

- For stocks with a small pool of lenders and few shares available to borrow, the borrower may compensate lenders to entice them into making the loan. The cost of borrowing, called a negative rebate or borrow fee rate, can exceed 100% for extremely difficult-to-borrow stocks.

When a stock pays a dividend, the stock price decreases by an amount equal to the dividend. Thus, in theory, substitute dividend payments from the securities borrower (i.e., short seller) to the securities lender are not an economic cost to the borrower. The short seller's gain from the stock price decline offsets the dividend to the borrower. This is related to the ***dividend irrelevancy*** theory, which maintains that, absent imperfections (e.g., income tax that penalizes dividends), payment of dividends does not alter shareholder wealth (i.e., has little or no effect on the company's stock price). However, in practice, this relationship may not hold; thus short sellers must accept that they are responsible for the dividend regardless of any dividend-related change in stock price. Short sellers are also responsible for costs such as commission and cost of borrow.

While short sellers hold their positions, the underlying stock price may rise or decline.

- If the stock price rises, the broker (lender) may require the borrower to post additional cash to ensure that the shares can be repurchased. If the borrower cannot do this in a timely manner, the lender can use the existing cash to close out the position to prevent further losses. When the short seller is ready to voluntarily close the position, he uses the posted cash to repurchase shares in the open market. The broker then returns these shares to the securities lender in exchange for the original collateral.
- If the stock price declines, the short seller buys back the shares at lower than the original short sale price and keeps the remaining cash (less commissions and fees) as profit.

For example, if a speculator borrows 100 shares of XYZ from a broker, he must post collateral to guarantee repayment of the loan. If the speculator sells each share for $30, he receives $3,000 (less commissions) from the sale and has a liability of 100 shares of XYZ stock.

- If XYZ stock price rises to $35 and the speculator closes the position, he would suffer a $500 loss (plus commissions).
- If XYZ stock price falls to $25, the speculator may buy 100 shares for $25 a share (for a total of $2,500 less commission) and return the 100 shares to the securities lender. This results in a profit of $500 (= $3,000 stock sale – $2,500 stock purchase) before commission and other fees.

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CALCULATE THE TOTAL RETURN OF A SHORT POSITION

Example

An institutional short seller establishes a short position in Winfelt Corp. stock at $70 per share. Winfelt pays an annual dividend of $1 per share. Lenders require borrowers to post collateral equal to 102% of the value of the securities, and the rebate on Winfelt shares is 1% per year. If Winfelt stock increased to $74 after one year when the position was liquidated, and commission and other transaction fees were 3 cents per share,

a) What is the effect of the dividend on the short seller's profit or loss?

b) What is the short seller's total dollar profit or loss?

a) When the stock pays a $1 dividend, the short seller must make a cash payment of $1 to the securities lender in lieu of the dividend. Therefore, the short seller loses $1 per share due to the dividend.

b) Short seller's total profit/loss = Capital gain/loss + Rebate – Dividend – Commission

When the stock increases to $74 (from $70), the short position suffers a capital loss of $4 per share.

The $1 dividend payout costs the short seller $1 per share, and the short seller receives a short stock rebate on 102% collateral of: 1% x ($70 x 1.02) = $0.714 per share.

Total commission and other transaction fees for both trades = 2 x $0.03 per share = $0.06.

=> Short seller's profit/loss = –$4 Capital loss + $0.714 Rebate – $1 Div. – $0.06 Comm.
= –$4.346 per share

Therefore, the short seller suffers a total loss of $4.346 per share.

While some short sales may be performed as term loans (e.g., of six months), where lenders agree not to demand return of securities until the end of the loan term, most securities lending is performed on an overnight basis, with lenders able to demand return of shares at any time and require borrowers to add to the collateral to reflect the borrowed securities' market prices. The latter can adversely affect short sellers with intermediate to long-term time horizons, since the short positions can be pulled by the broker at any time, potentially resulting in losses for the investors before their investment plans have had an opportunity to be realized.

Further discussion on negative rebate

SPECIAL SITUATIONS INVOLVING SHORT SELLING

Short selling involves several risks, particularly for stocks that are popular with short sellers.

1. ***Special stock***
   - Stocks popular with short sellers may become difficult to borrow and may be classified as being "on special" by the lender. A special stock requires higher net fees when borrowed, which results in the short seller receiving a smaller (even zero or negative) rebate on the

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posted collateral. With negative rebate, the borrower pays the lender an amount additional to the interest earned on the collateral.

- In contrast, a ***general collateral stock*** is not in high-borrowing demand and may earn a 2% rebate when risk-free rates are 2%.

2. Crowded short trades
   - These trades occur when numerous traders establish similar large short positions. The situation may result in a special stock. In extreme cases, the special stock may only be available for short sales at extremely high borrowing rates (e.g., 20%).
3. Lack of stock supply
   - If a stock is in low supply, short sellers' positions may be ***bought in***; i.e., lenders revoke borrowing privileges for the stock and require borrowers to cover the short positions. Borrowers would then aim to borrow the shares from another lender at affordable rates. If this is not possible, a position may be left unhedged, which would likely result in the trader selling the long position associated with the trade to reduce his portfolio's stock market risk.
4. ***Short squeeze***
   - This occurs when short sellers are forced to cover their positions by buying shares at high prices due to limited liquidity. The potential for a short squeeze increases as the number of shares being sold short increases relative to the number of shares available, making it increasingly difficult to borrow the shares.
   - Several short sellers being forced to buy in and simultaneously cover their short positions may put upward pressure on the shorted security's price, which may cause other short sellers to cover their positions, further forcing the stock price upward. This may result in some short sellers being squeezed out of their positions at high prices. Several hedge funds have suffered heavy losses due to short squeezes, including shorts in Volkswagen in 2008, Herbalife in 2013, and Gamestop in 2021.
5. Forced liquidation
   - Given that most securities are lent on a short-term basis, securities lenders may demand shares be returned at any time. In this case, brokers typically arrange for another securities lender to loan shares so that short sellers maintain their exposure.
   - However, in turbulent times (for the market or a particular stock), shares become difficult to borrow and short sellers may be forced to cover and close their positions by buying shares in the market and returning them to lenders. Being forced to liquidate positions is particularly severe during short squeezes. This risk is not an issue for those with long positions in stocks.

L.O. 6.1.3 DEMONSTRATE KNOWLEDGE OF ARBITRAGE-FREE FINANCIAL MODELS.

The term *arbitrage* may be used to describe strategies that aim to profit by assuming significant risk due to uncertainty (e.g., "arbitraging" price differences between growth and value stocks). However, true or *pure arbitrage* involves no risk bearing.

- Pure arbitrage opportunities exist when identical assets can be traded at different prices, enabling arbitrageurs to buy at the lower price and sell at the higher price, speculating that, in imperfect markets, prices of identical assets converge over time. Thus, when the arbitrage activity involves a long and a short position in two identical assets, profit is generated when the two asset prices converge to their identical price. When the activity involves a currency triangle (as described below), profit is generated until the assets converge and trade at parity.

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KEY EXTERNALITY OF ARBITRAGE ACTIVITIES

- A key externality of arbitrage activities is that they drive similar assets towards similar prices. This improves economic decisions as better asset prices are signals of more accurate information to producers and consumers, which, in turn, enables the balance of supply and demand at more efficient levels.

ARBITRAGE-FREE MODELS

An ***arbitrage-free model*** is a financial model that assumes that, with no trading restrictions (e.g., transaction costs or taxes), identical assets trade at identical prices. Thus, under these risk-free (or virtually risk-free) models, arbitrage opportunities do not exist or, if they exist, do not persist.

- Arbitrage-free frameworks facilitate the understanding of pricing relationships. For instance, in the absence of trading costs, if a euro is worth 1.15 U.S. dollars and a U.S. dollar is worth 3.75 Saudi Riyals, then the value of the euro will be 4.31 [= 1.15 × 3.75] Saudi Riyals.
  - ➢ If the euro differs from 4.31 Saudi Riyals, an arbitrage opportunity can be exploited to earn an arbitrage profit. Arbitrage opportunities are generally exploited until they disappear.

APPLICATIONS OF ARBITRAGE-FREE MODELS

Arbitrage-free financial models, which are applied to financial assets and derivatives, may involve almost instantaneous arbitrage transactions or carrying positions for extended time periods.

Arbitrage-free pricing models are ***relative pricing models*** that establish the relationship between two prices (they do not establish price levels). For instance, a relative pricing model may state that the price of a troy ounce of silver is worth about 10% more than an avoirdupois ounce of silver, because a troy ounce is about 10% larger than an avoirdupois ounce.[3]

- An ***absolute pricing model*** describes a value or price level based on its underlying economic factors. For instance, an absolute pricing model may model the price of a share of stock based on the stock's underlying fundamental factors (e.g., future dividends). In contrast to relative pricing models that are fairly accurate, absolute pricing models tend to be inaccurate since they are based on assumptions that do not hold for all investors.

ARBITRAGE-FREE PRICING IN SPOT MARKETS

A transaction that involves the purchase or sale of an asset for immediate delivery of the asset in exchange for cash takes place in the ***spot market*** or the ***cash market***. Technically, most financial transactions involve deferred delivery. However, the deferral of spot/cash transactions is very short and only lasts until the transaction is settled.

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[3] The term avoirdupois ounce (or pound) refers to the standard units used for weighing most everyday products (e.g., sugar, grains, meat, and people). It corresponds to the term ounce (or pound) that is more typically used. In contrast, troy ounces/pounds are the standard units for weighing precious metals.

One avoirdupois ounce equals 28.35 grams, while one troy ounce equals 31.10 grams. However, an avoirdupois pound weighs more than a troy pound (1 avoirdupois pound = 453.59 grams; 1 troy pound = 373.24 grams), because one avoirdupois pound is made up of 16 avoirdupois ounces, while one troy pound is made up of 12 troy ounces.

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Arbitrage-free pricing models involve two steps: 1) identifying two economically equivalent assets (or transactions), and 2) setting their values equal to each other (to form a relationship based on the values' underlying determinants).

- Therefore, arbitrage-free pricing in spot markets entails identifying two transactions in the spot market that have identical outcomes and requiring their prices to be equal.
- For instance, euros can be exchanged for Chinese Yuan by exchanging one euro for 7.2 Yuan in the spot foreign exchange market. However, there are numerous other ways of converting euros for Yuan. For instance, euros can be converted to Mexican pesos and then the Mexican pesos can be converted to Yuan. An arbitrage-free pricing model of foreign exchange rates would describe the relationships between all exchange rates so that no instantaneous trading among the currencies can generate a profit.

UNHEDGED AND HEDGED CARRY TRADES

Carry trades involve taking long and short positions with the expectation of "carrying" the positions for a period of time to capture a return. For instance, consider an environment in which a one-year default-free bond in an investor's domestic currency has a 5% yield and a comparable bond in a foreign currency has a 6.4% yield.

- Unhedged carry trade
  - The investor can establish a carry trade by borrowing in the domestic currency (i.e., shorting the domestic bond at a cost of 5%) and using the proceeds to buy the foreign bond; thereby locking in a 6.4% yield in the foreign currency.
  - The carry trade has a 1.4% interest rate spread. If both currencies remain the same for the time the positions are held, the strategy results in a 1.4% profit.
  - This is an unhedged trade that is exposed to exchange rate risk: the risk that the foreign currency's value decreases relative to the domestic currency. If this decrease in value is greater than 1.4% per year over the life of the trade, the strategy will experience a loss. Indeed, if interest rate spreads reflect different expected inflation rates, the foreign currency should be expected to weaken (and likely by an amount that offsets the rate spread on a risk-adjusted basis).
- Hedged carry trade
  - With this carry trade, the investor is exposed to the risk that the foreign bond proceeds are insufficient to settle the short domestic bond position at the end of the trade. Thus, the trade may be hedged by locking in the exchange rate between the two currencies so that the principal of the long bond at its maturity can cover the principal due on the short bond.
  - The hedge must enable the investor to exchange the proceeds of the long position to cover the obligation of the short position at a preset value. Hedging may be accomplished using derivatives (e.g., forward contracts) that lock in the exchange rate.
  - In an informationally efficient market, a trade fully hedged against risk should only generate the risk-free rate of return.

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L.O. 6.1.4 **DEMONSTRATE KNOWLEDGE OF HEDGE FUND RETURNS AND ASSET ALLOCATION.**

PROCESS OF ANALYZING A HEDGE FUND PROGRAM

This L.O. reviews several hedge fund strategies. Different strategies generate different returns and these returns need to be incorporated in the construction of a ***hedge fund program*** (i.e., procedures for constructing, monitoring, and maintaining a portfolio of hedge funds). One approach is to aggregate individual hedge funds' returns into a hypothetical portfolio diversified across hedge fund strategies. Another approach is to use the returns of a fund of hedge funds (FoF), which is an actual portfolio of hedge funds. There are three advantages to using an FoF.

1. FoFs directly reflect the actual investment experience of investors in diversified hedge funds.
2. Databases on FoFs have fewer biases than databases on individual hedge funds.
3. FoFs' net performance does not include costs associated with due diligence or portfolio construction. These costs, which are borne by the individual hedge funds' investors, are not reflected in the individual hedge funds' returns.

STRATEGIES GROUPED BY SYSTEMATIC RISK

Hedge fund strategies can be categorized into four broad groups based on their risk exposures. These groupings help investors to know their exposures so they construct appropriately diversified portfolios.

1. ***Equity strategies*** that exhibit substantial market risk.
2. ***Event-driven strategies*** that aim to profit by bearing event risk (e.g., failed mergers), and relative value strategies that aim to earn returns by taking risks associated with the convergence of asset prices.
3. ***Absolute return strategies*** that aim to minimize market and total risks (i.e., to have little/no beta exposure).
4. ***Diversified strategies*** that aim to diversify across different investment strategies.

Examples of these strategies are provided in Table 2, and a discussion thereof follows.

Equity Strategies	Event-Driven & Relative Value Strategies	Absolute Return Strategies	Diversified Strategies
1. Long/short equity 2. Short-bias	1. Event-driven 2. Relative value	1. Equity market-neutral 2. Market defensive funds of funds	1. Macro 2. Systematic diversified funds 3. Multi-strategy funds 4. Funds of hedge funds

Table 2: Hedge Fund Strategies by Risk Exposure

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EQUITY HEDGE FUND STRATEGIES

Hedge funds that adopt equity strategies invest primarily in equities, have significant equity market risk exposure, and always retain some net equity market exposure. They include long/short equity hedge and short-bias funds.

- Long/short equity funds
  - For instance, long/short funds may have 100% gross long exposures, 70% gross short exposures, and 30% net market exposure. The fund is exposed to only 30% of the market's beta risk (assuming an equivalent beta in the long and short portfolio); however, investors have 170% exposure to the manager's stock selection skill.
  - Funds with low net exposure likely outperform stocks in rapidly declining markets and underperform stocks in strong bull markets.
- Short-bias funds
  - These funds are net short with an average negative beta to equity markets. The funds may have only short positions or may have long positions. Their negative correlation with equities make them good risk reducers, particularly in equity bear markets.
  - However, these funds generate the lowest returns of any hedge fund strategy; even lower than stocks over a full market cycle. Despite this low return, short-bias funds generate a positive alpha (i.e., average return exceeds the return of the market portfolio when adjusted for the funds' negative systematic risk). The positive alpha indicates that short sellers may be highly skilled at stock selection.

EVENT-DRIVEN AND RELATIVE VALUE HEDGE FUND STRATEGIES

Event-risk strategies include event-driven and relative value strategies.

- These two strategies share a common theme of investing in a catalyst: their investments have a valuation discrepancy that should narrow based on a definable catalyst.
  - Event-driven strategies typically have hard catalysts, such as catalysts with a specific date and quantifiable trigger. For instance, managers of merger arbitrage trades know that the valuation discrepancies are realized no later than the date of the merger.
  - Relative value strategies typically have soft catalysts (i.e., no specific trigger that forces valuations to converge). For instance, a convertible arb manager may have a trade that offers an attractive spread between bond and stock prices. However, if the bond maturity is several years away, only general market forces and rational investing will make the arb trade converge in a timely manner.
- These strategies hold long and short, typically hedged, positions. For instance, merger arbitrage funds typically hold equal and offsetting amounts of stock market risk in their long and short positions. Fixed-income and convertible bond arbitrage strategies also hold positions with offsetting risks as they aim to minimize risks such as equity market and interest rate risks.
- Event-risk strategies have historically had the lowest standard deviation and largest negative skewness and excess kurtosis values. They consistently earn small profits, but periodically suffer large losses, presenting a return pattern similar to the earnings of insurance companies that regularly collect small premiums but periodically experience large negative returns.
  - This pattern is reflected in empirical results of merger arbitrage funds that consistently generated 0%-2% monthly returns with much lower standard deviation than the equity markets and, due to their significant event risk exposure, have returns with large negative skew and leptokurtosis. Thus, merger arbitrage is similar to selling insurance (or selling a put option), which essentially enables managers to underwrite the risk of loss associated with a failed merger.

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EVENT RISK AND VOLATILITY STRATEGIES IN HEDGE FUNDS

Many event-related and relative value arbitrage strategies may be described as writing (or shorting) options. The effective sales of options via these arbitrage strategies and the actual sale of option securities are referred to as ***short volatility exposures***; which are risk exposures that result in losses when underlying return volatilities increase.

- Event risk strategies have short volatility exposure because they are negatively exposed to major events, which can cause market volatility. Similarly, short volatility strategies are exposed to event risk because major events can create higher return volatilities.
- In stable or normal markets, if realized volatility is less than anticipated volatility, short volatility strategies profit by collecting premiums. If the unexpected happens, these strategies suffer a loss due to the failure of an expected event or volatility increasing more than expected.

EVENT RISK AND INSURANCE STRATEGIES IN HEDGE FUNDS

Event risk is an ***off-balance-sheet risk*** (i.e., exposure is not explicitly reflected on a hedge fund's balance sheet). For instance, merger arbitrage hedge fund's balance sheet would show the offsetting long and short positions reflecting the purchase and sale of the target and acquiring companies' stocks. However, these positions may be interpreted as offsetting one another in a hedged portfolio. Thus, the balance sheet positions do not reflect the strategy's true risk, i.e., the hedge fund's issuance of financial market insurance against the possibility that the deal will fail.

The payoff profile and exposure to downside risk of event-driven strategies makes them similar to insurance companies or sellers of put options, who also regularly collect small premiums but periodically suffer considerable losses. Their downside exposure is exacerbated by the use of leverage. A basic risk management approach with these strategies is to invest in hedge funds that limit their leverage use.

- Selling insurance
  - For each insurance policy, an insurance company receives a premium and assumes a risk. If no adverse event occurs, the company keeps the premium, which represents a profit. However, if an adverse event occurs, the company must pay the policy holder the face value of the contract, which may represent a considerable loss to the company.
  - In the case of a merger arbitrage hedge fund, the manager buys a target firm's stock and sells the acquiring firm's stock, thus taking on the risk that the merger will not take place. Investors can gain a small, consistent profit if the merger goes through as expected. However, if the merger fails, the target firm's price will decrease and the acquiring firm's price will increase, resulting in a potentially significant loss to the hedge fund. Therefore, merger arbitrage funds may be seen as insurance agents who provide insurance to the target firm's shareholders to shield them in the event the merger fails to go through.
  - In the case of ***convergent strategies*** (e.g., relative value funds), they profit when relative value spreads become tighter (i.e., security prices converge to values that are considered appropriate). Thus, a relative value fund manager buys a less liquid or lower-credit-quality security and shorts a similar, more liquid or creditworthy security, betting that the prices of the two securities will converge so the fund will earn the initial spread between the securities. However, if an unexpected market event occurs, the prices of the two securities may diverge, resulting in a loss to the hedge fund. This is like selling financial market insurance against market events.

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- Selling a put option
  - The sale or writing of a put option is similar to selling insurance against the completion of a financial transaction (e.g., a merger). In a normal market environment, the put expires unexercised (since the merger is completed and the target's share does not fall) and the hedge fund manager profits from the premium collected. If the merger fails to be completed and the prices of the two companies engaged in the merger diverge (instead of converging), the put is exercised against the fund manager, who suffers a loss as he must pay the difference between the lower market price of the target and the option strike price (or the face value of the insurance contract).

Credit-risky investments (e.g., high-yield bonds) are also similar to selling insurance or put options. With high-yield bonds, the insurance seller (or option writer) is liable for losses due to credit events such as credit downgrades, defaults, or bankruptcies. This credit event exposure results in returns with negative skew and leptokurtosis, reflecting the position's downside or fat-tailed risk.

Long Term Capital Management (LTCM) is arguably one of the most renowned relative value arbitrage funds, founded in 1994 by prominent academics and industry professionals.

- It implemented relative value trades with extremely high leverage ratios and profited for a number of years as its bets paid off that spreads between similar securities would converge. Its short put option exposure enabled it to collect option-like premiums for insuring the convergence in prices.
- In the summer of 1998, the Russian government defaulted on its bonds, resulting in a flight to quality as investors sought the safety of most creditworthy instruments. This unexpected event caused valuations of similar securities to diverge (instead of converge). As a result, LTCM suffered significant losses and was forced to liquidate its positions. In fact, LTCM's trades eventually converged, but, due to the enormous amount of leverage used, the fund was not able to maintain the trades and had to realize losses before the spreads finally converged. The collapse of LTCM also had an impact on financial markets.[4]

ABSOLUTE RETURN STRATEGIES IN HEDGE FUNDS

Hedge fund managers who adopt ***absolute return strategies*** aim for consistently positive (or, more specifically, greater than the risk free rate) returns. They do not aim for performance relative to a benchmark. Many managers have concentrated portfolios with relatively few positions and, typically claim to generate returns based on their skill at security selection, with the portfolio's market risk hedged by short positions in broad indices or overvalued stocks in the same industry. Some hedge funds also minimize their exposure to credit and equity market risks, resulting in returns with little or no skew and low or negative kurtosis.

Many single-strategy hedge funds, particularly event-driven or directional strategies, may struggle to earn positive absolute returns. However, diversification across hedge fund strategies should generate more consistent absolute returns. Two strategies that appear to provide absolute returns are equity market-neutral and market-defensive funds of funds, which have low standard deviations, low drawdowns, low correlations to equity markets, and skewness and kurtosis values that indicate close to normal returns.

[4] LTCM started with investments of $1.3 billion and applied exceedingly high leverage ratios (cash was leveraged at about 25 to 1 and derivative positions at about 300 to 1). By September 1998, severely impacted by the Russian bond default, LTCM had lost significant amounts of its mortgage-backed arbitrage portfolio and was close to collapse. Since its demise had the potential to significantly impact markets worldwide, to prevent a global crisis, the Federal Reserve worked with a consortium of U.S. investment and commercial banks to provide LTCM with $3.6 billion in capital. In return, the banks took 90% ownership of LTCM.

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Return distributions of hedge funds differ significantly from those of mutual funds, which are ***relative return products*** driven by broad market returns and evaluated relative to a benchmark index. Mutual fund managers, with their concentration in long positions and narrow investment mandate, are considered successful when their returns exceed their benchmark return. This contrasts with hedge fund managers who are assessed by their level of consistently positive returns.

DIVERSIFIED STRATEGIES IN HEDGE FUNDS

Diversified hedge funds can be an attractive addition to a portfolio from a diversification perspective. Diversified strategies are implemented by macro funds, systematic diversified funds (i.e., managed futures funds), multi-strategy funds, and funds of hedge funds. They can generate high returns, reasonable risks, and low drawdowns.

- Macro and systematic diversified funds have generated returns that are close to normally distributed. If this symmetrical performance persists, these funds would be the ideal investment for risk-averse investors.
- In periods of major market dislocation (e.g., 2008 and 2020), managed futures funds generated a profit and macro funds maintained their values and generated modest positive returns, which contrasts with many funds that experienced significant losses.

L.O. 6.1.5 **DEMONSTRATE KNOWLEDGE OF INVESTING IN MULTISTRATEGY FUNDS.**

Multi-strategy funds (MSFs) invest across several hedge fund strategies. Each fund typically has one manager who allocates capital to several sub-managers focusing on specific strategies. MSFs provide advantages over FoFs in terms of fees, flexibility, and transparency. A discussion of these advantages follows.

ADVANTAGES OF MSFS – FEES

- No double layer of fees
  - The key advantage of MSFs over FoFs is that, unlike FoFs, MSFs do not have a double layer of fees. This is significant in terms of MSFs' net-of-fees performance.
  - FoFs, in addition to paying fees (e.g., 1.5% and 20%) to each underlying manager, pay the FoF manager an additional fee (e.g., 0.5% and 5%, resulting in total fees of 2% and 25%).
- ***Fee netting***
  - Some MSFs use ***fee netting*** when calculating incentive fees, which entails netting the negative returns of the managers in the MSF against the other MSF managers' positive returns, resulting in MSF investors only paying incentive fees on net profits of the combined strategies. This lowers total profits on which incentive fees are paid and, thus, lowers incentive fees paid to managers. A study finds that fee netting saves MSF investors an estimated annual average of 0.23%.
    - Without fee netting, each manager in the MSF earns an incentive fee for positive performance, but the MSF's total incentive fee charged to investors is not offset by the MSF managers' negative performance.
  - In contrast, FoFs provide no netting of fees. Thus, given identical negative and positive returns from different strategies, MSFs that use fee netting charge lower incentive fees than FoFs.

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- Despite the advantage of fee netting for MSFs, there are downsides since the success of MSF is based on two factors.
  i. Ability to attract and retain talented managers.
     - This is the most important factor, and is a major issue with respect to fee netting since managers who are confident in being able to generate positive returns generally prefer to work at MSFs that do not use fee netting to avoid not receiving incentive fees when the fund as a whole suffers a loss.
  ii. Ability to opportunistically allocate capital across the portfolio as market opportunities arise.

ADVANTAGES OF MSFS – FLEXIBILITY AND TRANSPARENCY

Compared to FoFs, MSFs have greater transparency and more flexibility to make tactical allocation and risk management decisions. MSF managers have real-time access to all portfolio positions and can quickly reallocate capital and direct sub-managers to reduce or expand positions as appropriate. Thus, MSF managers are not restricted by lockups and redemption periods. Transparency also allows MSF managers to manage their funds' total risk, implementing portfolio-level hedges as appropriate.

In contrast, FoF managers need to manage the liquidity terms of their investments (e.g., lockup periods and redemption restrictions) since their underlying managers are each subject to liquidity terms and limited transparency. In addition, some of the FoF's underlying managers may not be forthcoming with information about their portfolios. This lack of transparency makes it difficult for FoF managers to obtain timely financial information.

- To address these issues, some hedge fund companies build their own internal FoFs, offering investors different hedge fund strategies.
- While this approach addresses the transparency and liquidity constraint issues, a drawback is that the investment opportunities offered to investors are based only on the single company's products as opposed to the universe of hedge funds. In addition, empirical studies find that tactical reallocation across hedge fund strategies is less valuable than between traditional stock and bond investments (e.g., best- and worst-performing hedge fund reallocation strategies had returns differing by 3.8% per year, while the difference of swapping between stock and bond investments was 8.6% per year).
- Studies also find no evidence of FoFs' market timing skill (although measuring timing skill of multi-strategy managers is challenging).

ADVANTAGES OF FOFS: MANAGER SELECTION & OPERATIONAL RISK MANAGEMENT

Compared to MSF funds, FoFs are better able to add value through manager selection and managing operational risks.

1. Manager selection
   - FoF managers can allocate to any single-fund manager in the hedge fund universe.
   - In contrast, MSF managers have considerably smaller pools of hedge fund managers from which to select. Their process of hiring trading teams to execute specific strategies and reallocating capital across teams when necessary involves working with about 4 (for the four major strategies) to hundreds of traders.
   - Empirical evidence supports the importance of manager selection over asset allocation for alternative investments. Reddy, Brady, and Patel find a 7% annual difference in returns

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between top- and bottom-quartile hedge fund managers, with only 3.8% return difference across hedge fund strategies. This result suggests that, in contrast to traditional investments, manager selection is more important than asset selection with hedge funds.

2. Operational risks
   - FoFs' operational risk is diversified across 10-20 independent managers, so failure of one of its managers does not affect the other managers and does not result in significant losses for the FoF. For instance, investors in a 20-manager FoF may only be exposed to a 5% loss if one of the FoF's managers fails.
   - In contrast, an MSF has one operational infrastructure, so failure of one of its underlying strategies, which may also occur due to market or tail risk, can have a significant adverse effect on the MSF.

Empirically, MSFs have outperformed FoFs on a risk-adjusted basis, largely due to the fees.

- For instance, Agarwal and Kale find that, after controlling for market risk exposure, MSFs' net-of-fees alpha is higher than that of FoFs by 3%-3.6%. The researchers attribute this outperformance to a self-selection effect, wherein the most talented single-strategy hedge fund managers select to become multi-strategy managers.
- On the other hand, it has been argued that most talented hedge fund managers prefer to manage their own funds so that they can earn incentive fees based on their skill.

L.O. 6.1.6 **DEMONSTRATE KNOWLEDGE OF RESEARCH STUDIES ON HEDGE FUNDS.**

FINDINGS ON HEDGE FUND PERFORMANCE

- Evidence indicates that shocks felt by one segment of the hedge fund industry reverberate through to many other hedge fund strategies.
- Evidence indicates that historical hedge fund returns may consistently overestimate future results. The research has not factored in the significant growth in the hedge fund industry over the past decade and its effects on returns.
- The empirical evidence generally suffers from biases embedded in the data (e.g., selection or survivorship bias). If these biases are not addressed, they can inflate estimated annual hedge fund returns by 70 to 450 basis points.[5]

Most studies examine hedge funds in a mean-variance framework in which Sharpe ratios are used to compare hedge fund performance. The Sharpe ratio provides a good risk-adjusted performance measure for securities with normally distributed returns and symmetric payoff structures (i.e., where upside and downside potential are about the same). However, many hedge fund positions are exposed to significant event risk or are in derivative securities that generate asymmetric (i.e., nonlinear) payoffs. Since this may not be apparent in a Sharpe ratio analysis, resulting Sharpe ratios may be misleading and consequently result in incorrect portfolio allocations. Evidence exists to this effect.

- Bernardo and Ledoit demonstrate that Sharpe ratios are misleading when return distributions are not normal.

[5] These types of biases are discussed later in this Reading.

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- Spurgin shows that managers can boost their Sharpe ratios by selling off the potential return distribution's upper end. For instance, they can enter a swap to pay the year's highest monthly return and be compensated for the year's lowest monthly return.

Some people allege that speculation causes market volatility, while others allege that market volatility invites speculation. Empirical and theoretical evidence are mixed on the subject. While speculation is only profitable on long positions when speculators buy low and sell high, in theory, these transactions should stabilize prices since the prices get pushed toward their average values. In terms of empirical work, little long-term evidence exists to suggest that markets that allow speculative activity become more volatile in the long run.

Hedge fund activity is also at times charged with causing market volatility, undermining financial markets, and causing or exacerbating financial crises. Often major, negative news about a hedge fund manager can make investors reluctant to invest with the fund manager. This is a consequence of ***headline risk*** (i.e., dispersion in economic value from key, unexpected news-related events). True headline risk from hedge funds is due to issues of fraud, operational risk, or risk management issues causing major losses; not due to hedge funds' impact on markets.

MARKET IMPACT OF HEDGE FUNDS – 1997 ASIAN CURRENCY CRISIS & 2007 CRISIS

Different hedge fund activities have triggered controversy related to market crises.

- Brown, Goetzmann, and Park test whether currency positions taken by George Soros and other hedge fund managers in 1997 caused the crash of the Malaysian ringgit, as contended by the Malaysian prime minister, Mahathir bin Mohammad, and other Asian governmental leaders. The authors regressed the percentage change in the exchange rate on the currency exposure held by 11 large macro hedge funds and found no evidence that the Malaysian ringgit was affected by hedge fund currency exposures.
  - They also tested whether macro hedge funds caused the 1997 Asian contagion (i.e., decline in several Asian currencies). They find no evidence to that effect.
- Fung and Hsieh measure the effect of hedge fund positions on different financial market events including the October 1987 stock market crash, 1992 devaluation of the pound sterling, and 1997 Asian contagion. They find that hedge funds impacted the market and exacerbated decline in some situations, but did not trigger an event or influence the markets away from their economic fundamentals.
  - For instance, in 1992, George Soros successfully bet on the devaluation of the British pound sterling (and Italian lira), making a profit of ~$3 billion. However, the pound sterling at that time was strained by large capital outflows from the U.K. Therefore, Soros did not trigger the devaluation of the currency; he simply exacerbated its decline.
  - This and the Asian currency crisis were in fact due to economic and monetary policies, not hedge fund strategies.
- Khandani and Lo examine the large losses suffered by quantitative hedge funds in early August 2007. The authors maintain that the losses were most likely triggered by a rapid unwinding of large equity market-neutral hedge funds. Also, since hedge funds can fairly easily withdraw liquidity, a synchronized withdrawal by a large group of funds could have a systematic effect on the financial system.
  - Despite the negative issues associated with hedge funds, the authors argue that hedge funds provide advantages in the form of providing liquidity, engaging in price discovery, identifying new return sources, and facilitating the transfer of risk. Furthermore, hedge

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funds that short sell assets may reduce market volatility, since they sell assets as prices increase and buy assets as prices decrease.

- In other words, hedge funds can take risks that traditional investors cannot (for structural or risk aversion reasons); thus they earn a return premium for providing liquidity to markets where and when others do not want to enter.

L.O. 6.1.7 **DEMONSTRATE KNOWLEDGE OF HEDGE FUND INDICES.**

Traditional investment funds are fairly easily benchmarked to an index of traditional investments. In contrast, hedge fund investments are largely alpha-driven and actively managed (thus, almost pure bets on the skill of hedge fund managers); therefore, their risks and returns are not easily described by conventional financial market benchmarks. Nevertheless, hedge fund indices are useful benchmarks for two reasons.

1. They can serve as a proxy for a hedge fund asset class, which is important for asset allocation.
2. They can serve as performance benchmarks for hedge fund managers.

Hedge fund index providers construct indices based on return data voluntarily reported by hedge fund managers to database collectors. There are several hedge fund index providers; each with different index construction techniques, different numbers of hedge funds, and potentially little overlap in the funds across providers. This L.O. addresses issues related to constructing hedge fund indices and factors that affect their performance.

MANAGEMENT & INCENTIVE FEES ON HEDGE FUNDS & HEDGE FUND INDICES

According to Fung and Hsieh, out of the live hedge funds in three databases (i.e., Trading Advisor Selection System [TASS], HFR, and Center for International Securities and Derivatives Markets [CASAM/CISDM]), more than 70% charge a management fee of 1%-2% and the majority charge an incentive fee of 20%. However, since this study was published, fees have decreased with management fees of 1.5% as common as 2% and most incentive fees now between 15% and 20%.

All hedge fund indices calculate performance net of fees. However, there are two ways in which the fee structure can result in different performance than reported by a hedge fund index.

1. Frequency
   - Incentive fees are calculated annually, whereas indices provide monthly performance. Therefore, each month, estimated (or forecasted) incentive fees need to be subtracted from performance. Since the year-end incentive fees may differ from the monthly estimates, the estimated monthly returns may contain estimation errors.
   - To account for updates to the original estimates, indices sometimes revise performance figures several months after the first publishing date.
2. ***Fee bias***
   - Since hedge funds are typically structured as private limited partnerships, they may offer investors multiple fee structures, have negotiated fees for different investors, or revise their fee structures over time. Since investors may select or negotiate different fees, their net-of-fees returns likely differ. Over time, more successful managers tend to increase their fees.
   - Therefore, index returns may overstate returns that new investors could earn because the fees used to estimate the index returns are lower than the fees that new investors would typically pay. This is referred to as fee bias.

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