Alternative Investments for Portfolio Management

Study Session 13

Topic Weight on Exam	5–15%
SchweserNotes™ Reference	Book 4, Pages 8–74

You could see alternative investments on the exam in a variety of questions: as part of a potential asset allocation for an individual; as part of a case for an institutional investor; or even as a stand-alone item set. I consider Alternative Investments to be a CFA favorite. Know this material well!

Alternative Investments Portfolio Management[1]

Cross-Reference to CFA Institute Assigned Reading #36

There are **six basic categories** of alternative investments: *real estate, private equity, commodities, hedge funds, managed futures,* and *distressed securities*.

Common Features of Alternative Investments

1. Low liquidity.
2. Diversification benefits.
3. High due diligence costs.
4. Difficult to value.
5. Limited access to information.

Due diligence checkpoints for investing in alternative investments include:

1. Assess the market opportunity offered.
2. Assess the investment process.
3. Assess the organization of the manager.
4. Assess the people.
5. Assess the terms and structure of the investment.
6. Assess the service providers (i.e., lawyers, brokers, ancillary staff).
7. Review documents, such as the prospectus and other memoranda.

1. The terminology used throughout this section is industry convention as presented in *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Ch. 8, "*Alternative Investments Portfolio Management*," Jot K. Yau et al. In addition, facts, figures, and returns presented are from *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Ch. 8, "*Alternative Investments Portfolio Management*," Jot K. Yau et al.

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Issues for Private Wealth Clients

1. **Tax issues** can be unique to the individual.
2. Determining the **suitability** of investments varies across individuals.
3. **Communication** with the client is important because the client may not be knowledgeable enough to effectively communicate his/her needs.
4. **Decision risk** is the risk of irrationally changing a strategy.
5. Wealthy individuals frequently hold **concentrated portfolios**.

Alternative Investment Groups

Real Estate

Indirect real estate investments include:

- Companies that develop and manage real estate.
- REITS.
- CREFs.
- Infrastructure funds, which provide private investment in public projects.

Direct investments in real estate generally have low liquidity, large size, high transactions costs, and asymmetric information in transactions (low transparency).

Real estate provides diversification to a stock/bond portfolio, but real estate as an asset class and each individual real estate asset can have a large idiosyncratic risk component.

Private Equity

Private equity subgroups include *start-up companies, middle-market private companies,* and *private investment in public entities*. The distinguishing feature of the subgroups is the stage of development of the company receiving the invested dollars. Investments in start-up and middle-market private companies have more risk and lower returns than investments in established companies via buyout funds. They also suffer from the risks associated with asymmetric information. All the categories have low liquidity.

A *direct* investment in private equity is when the investor purchases a claim directly from the firm.

Indirect investment is usually done through private equity funds, which include venture capital (VC) and buyout funds.

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Commodities

Direct investment is either the purchase of the physical commodity or the derivatives on those assets. *Indirect* investment in commodities is usually done through investment in companies whose principal business is associated with a commodity.

Investments in both commodity futures and publicly traded commodity companies are fairly liquid. Investments in commodities have *low correlation with stocks and bonds*, and most have a *positive correlation with inflation*.

Managed Futures

Managed futures funds share many characteristics with hedge funds. The primary legal structure of most managed futures in the United States is the limited partnership. Managed futures funds also utilize much the same compensation scheme for managers. Like hedge funds, they are usually classified as absolute return strategies.

The primary feature that distinguishes managed futures from hedge funds is managed futures funds tend to trade only in derivatives markets. Also, managed futures funds generally take positions based on indices, while hedge funds tend to focus more on individual asset price anomalies.

Buyout Funds

Buyout funds are the largest segment of the private equity market and can be divided into *middle market buyout funds* and *mega-cap buyout funds*. The primary difference between the two is the size of the target.

Middle-market buyout funds concentrate on divisions spun off from larger, publicly-traded corporations and private companies that, due to their relatively small size, cannot efficiently obtain capital. **Mega-cap buyout funds** concentrate on taking publicly-traded firms private.

Buyout funds usually capture value for their investors by selling the acquisitions through private placements or IPOs or through *dividend recapitalization*. In a dividend recapitalization, the buyout fund issues debt through an acquired firm and pays a special dividend to itself and other equity investors. *Recapitalization* in this case refers to reducing the firm's equity and increasing its leverage, sometimes to critical levels. Notice, however, that the buyout fund retains control.

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Infrastructure Funds

Infrastructure funds specialize in purchasing public infrastructure assets (e.g., airports, toll roads) from cities, states, and municipalities. Since infrastructure assets typically provide a public service, they tend to produce relatively stable, long-term real returns.

They tend to be regulated by local governments, which only adds to the predictability of cash flows. Their low correlation with equity markets means infrastructure assets provide diversification, and their long-term natures provide a good match for institutions with long-term liabilities (e.g., pension funds). Their relatively low risk, however, means that infrastructure returns are low.

Distressed Securities

Analysts often consider distressed securities to be part of the hedge fund class of alternative investments. It may also be part of the private equity class. One way to construct subgroups in distressed securities is by structure, which determines the level of liquidity. The hedge-fund structure for distressed security investment is more liquid. The private equity fund structure describes funds that are less liquid, because they have a fixed term and are closed ended.

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Alternative Investment Benchmarks

Figure 1 presents a summary of alternative investment benchmarks, their construction, and their associated biases.

Figure 1: Alternative Investment Benchmarks

	Benchmarks	*Construction*	*Biases*
Real estate	NCREIF; NAREIT.	NCREIF is value-weighted; NAREIT is cap-weighted.	Measured volatility is downward biased. The values are obtained periodically (annually).
Private equity	Provided by Cambridge Associates and Thomson Venture Economics.	Constructed for buyout and venture capital. Value depends upon events. Often construct custom benchmarks.	Repricing occurs infrequently which results in dated values.
Commodities	Dow Jones-AIG Commodity Index; S&P Commodity Index.	Assume a futures-based strategy. Most types considered investable.	Indices vary widely with respect to purpose, composition, and method of weighting.
Managed futures	MLMI; CTA Indices.	MLMI replicates the return to a trend-following strategy. CTA Indices use dollar-weighted or equal-weighted returns.	Requires special weighting scheme.
Distressed securities	Characteristics similar to long-only hedge fund benchmarks.	Weighting either equally-weighted or based upon assets under management. Selection criteria can vary.	Self-reporting; backfill or inclusion bias; popularity bias; survivorship bias.

Hedge Fund Benchmarks

Hedge fund benchmarks vary a great deal in composition and even frequency of reporting. Also, there is no consensus as to what defines hedge fund strategies, and this leads to many differences in the indices as style classifications vary from company to company.

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The following list is of providers of *monthly indices* with a few of their general characteristics:

- *CISDM of the University of Massachusetts*: several indices that cover both hedge funds and managed futures (equally-weighted).
- *Credit Suisse/Tremont*: provides various benchmarks for different strategies and uses a weighting scheme based upon assets under management.
- *EACM Advisors*: provides the EACM100® Index, an equally-weighted index of 100 funds that span many categories.
- *Hedge Fund Intelligence, Ltd.*: provides an equally-weighted index of over 50 funds.
- *HedgeFund.net*: provides an equally-weighted index that covers more than 30 strategies.

Biases often exist in these indices because of the *self-reporting* of fund returns. This can apply to returns as they are earned or when filling in gaps in the historical data. *Backfill* or *inclusion bias* is the potential bias when a hedge fund joins an index and the manager adds historical data to complete the series. Also, the methods for selecting and weighting funds included in the index can cause a wide range of return differences among indices in the same class.

- **Popularity bias** can result if one of the funds in a value-weighted index increases in value and then attracts a great deal of capital.
- **Survivorship bias**. Indices may drop funds with poor track records or that fail, causing an upward bias in reported values.

Return Enhancement and Diversification

Real estate. High risk-adjusted performance is possible because of the low liquidity, large sizes, high transactions costs, and low information transparency that usually means the seller knows more than the buyer. Real estate provides great *diversification* potential.

Private equity is less of a diversifier and more a long-term return enhancer.

Commodities offer *diversification* to a portfolio of stocks and bonds. The returns on commodities are generally lower than stocks and bonds.

Hedge funds generated higher returns than stocks and bonds over the period 1990–2004 and generally provide moderate to good *diversification* benefits.

Managed futures provide returns similar to that of hedge funds and can provide *diversification*.

Distressed securities have generally beaten stocks and bonds but have a large negative skew and are uncorrelated with the overall stock market.

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Direct Real Estate Equity Investing

Advantages:

- Many expenses are tax deductible.
- Ability to use more leverage than most other investments.
- More control than stock investing.
- Ability to diversify geographically.
- Lower volatility of returns than stocks.

Disadvantages:

- Lack of divisibility.
- High information commission, operating and maintenance, and management costs.
- Special geographical risks.

Venture Capital Investing

Issuers of venture capital include *formative-stage companies* and *expansion-stage companies*. **Buyers** of venture capital include: *angel investors, venture capitalists,* and *large companies,* who are also called *strategic partners*.

The **stages** through which private companies pass are: early stage, later stage, and exit stage.

In contrast to venture capital funds, **buyout funds** usually have:

- A higher level of leverage.
- Earlier and steadier cash flows.
- Less error in the measurement of returns.
- Less frequent losses.
- Less upside potential.

Convertible preferred stock is a good vehicle for direct venture capital investment, because preferred stockholders must be paid a specified amount, before common stockholders receive distributions.

Private Equity Investing

Private equity funds usually take the form of **limited partnerships** or **limited liability companies** (LLC).

The sponsor (i.e., general partner) typically gets a *management fee* and *incentive fee*. The **management fee** is usually 1.5% to 2.5% and is based upon the *committed funds*. The **incentive fee** is also called the carried interest. It is the share of the

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profits that are paid to the manager after the fund has returned the outside investors' capital. A *claw-back* provision may be in place that requires the manager to give back money, if the expected profits are not realized.

Any strategy for private equity investment must address:

- Low liquidity.
- Diversification through a number of positions.
- Plans for meeting capital calls.

The Term Structure of Futures Prices

Direct commodity investment entails either purchasing the actual commodities or gaining exposure via derivatives. **Indirect commodity investment** is the purchase of indirect claims, like shares in a corporation that deals in the commodity.

Direct investment gives more exposure, but cash investment in commodities can incur carrying costs. Indirect investment may be more convenient, but it may provide very little exposure to the commodity, especially if the company is hedging the risk itself.

The components of the return to a commodity futures contract are the *spot return*, the *collateral return*, and the *roll return*.

total return = spot return + collateral return + roll return

The *spot return* (a.k.a. *price return*) is the return on the futures caused by the change in the underlying commodity's price.

The *collateral return* (a.k.a. *collateral yield*) is approximately the risk-free rate.

Roll return (a.k.a. *roll yield*) is usually the result of *normal backwardation*.

The returns of many types of commodities have a **positive correlation with inflation**.

Agricultural commodities can have a **negative correlation with inflation**, because they are not storable.

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Hedge Fund Classifications

Hedge funds have been classified in various ways by different sources. Since hedge funds are a "style-based" asset class, strategies can determine the subgroups. Within the strategies, there can be even more precise subgroups, such as long/short and long-only strategies. The following is a list of nine of the more familiar hedge fund strategies.

1. *Convertible arbitrage* commonly involves buying undervalued convertible bonds, preferred stock, or warrants, while shorting the underlying stock to create a hedge.
2. *Distressed securities* investments can be made in both debt and equity. Since the securities are already distressed, shorting can be difficult or impossible.
3. *Emerging markets* generally only permit long positions, and often there are no derivatives to hedge the investments.
4. *Equity market neutral* (pairs trading) combines long and short positions in undervalued and overvalued securities, respectively, to eliminate systematic risk while capitalizing on mispricing.
5. *Fixed-income arbitrage* involves taking long and short positions in fixed-income instruments based upon expected changes in the yield curve and/or credit spreads.
6. *Fund of funds* describes a hedge fund that invests in many hedge funds. They tend to be more correlated with equities than with individual hedge fund strategies.
7. *Global macro strategies* take positions in major financial and non-financial markets through various means (e.g., derivatives and currencies). They tend to focus on an entire group or area of investment instead of individual securities or classes of securities.
8. *Hedged equity strategies* (a.k.a. *equity long-short*) represent the largest hedge fund classification in terms of assets under management. They take long and short positions in under- and overvalued securities, respectively, similar to equity market neutral strategies. The difference is that hedged equity strategies do not focus on balancing the positions to eliminate systematic risk and can range from net long to net short.
9. *Merger arbitrage* (a.k.a. *deal arbitrage*) focuses on returns from mergers, spin-offs, takeovers, etc.

Another classification scheme divides hedge funds strategies into five general segments: *relative value, event driven, hedged equity, global asset allocators*, and *short selling*.

1. *Relative value* strategies attempt to exploit price discrepancies.
2. *Event-driven* strategies invest with a short-term focus on an event, like a merger (merger arbitrage) or the turnaround of a distressed company (distressed securities).

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3. *Hedged equity* entails taking long and short equity positions with varying overall net long or short positions and can include leverage.
4. *Global asset allocators* take long and short positions in a variety of both financial and non-financial assets.
5. *Short selling* takes short-only positions.

Styles that are mainly long-only tend to offer less potential for diversification than long/short styles, and liquidity can vary from fund to fund or even within subgroups. A hedge fund within any of the classes can have a lock-up period, for example.

Hedge Fund Structure

The most common **compensation structure** of a hedge fund consists of an assets-under-management fee, or *AUM fee*, and an *incentive fee*. **High water marks** are typically employed to avoid incentive fee double-dipping.

A **lock-up period** is a common provision in hedge funds that limits withdrawals by requiring a minimum investment period (e.g., one to three years), and designating exit windows. The rationale is to prevent sudden withdrawals that could force the manager to have to unwind positions.

Hedge Fund Incentive Fees

Incentive fees are paid to encourage the manager to earn even higher profits. There is some controversy concerning incentive fees, because the manager should have goals other than simply earning a gross return. For example, the manager may be providing limited downside risk and diversification. An incentive fee based upon returns does not reward this service.

Managers with good track records often demand higher incentive fees. The concern for investors is whether the manager with a good historical record can continue to perform well enough to truly earn the higher fees.

Fund of Funds

A **fund of funds** (FOF) is a hedge fund that consists of several, usually 10 to 30, hedge funds. The point is to achieve diversification, but the extra layer of management means an extra layer of fees. Often, a FOF offers more liquidity for the investor, but the cost is cash drag caused by the manager keeping extra cash to meet potential withdrawals by other investors.

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A FOF may serve as a *better* indicator of aggregate performance of hedge funds (i.e., a better benchmark), because they suffer from less survivorship bias. If a fund of funds includes a fund that dissolves, it includes the effect of that failure in the return of the fund of funds, while an index may simply drop the failed fund.

A FOF can, however, suffer from **style drift** and FOF returns have been more highly correlated with equity markets than those of individual hedge funds. This can produce problems in that the investor may not know what she is getting. Over time, individual hedge fund managers may tilt their respective portfolios in different directions. Also, it is not uncommon for two FOF who claim to be of the same style to have returns with a very low correlation.

Hedge Fund Performance Evaluation

Some claim that hedge funds **absolute-return vehicles**, which means that no direct benchmark exists. To create comparable portfolios, analysts (1) create single and multi-factor models and (2) use an optimization technique to create a tracking portfolio.

Conventions to consider in hedge fund performance evaluation are the impact of performance fees and lock-up periods, the age of funds, and the size of funds. Empirical studies have found that:

- Funds with longer lock-up periods tend to produce higher returns than those with shorter lock-up periods.
- Younger funds tend to outperform older funds.
- Large funds underperform small funds.

Returns. By convention, hedge funds report *monthly* returns, which are then compounded to arrive at annual returns. Note that returns are often biased by entry into and exit from the fund, which are allowed on a quarterly or less-frequent basis, and by the frequency of the manager's trading (i.e., cash flows). To smooth out variability in hedge fund returns, investors often compute a *rolling return*, such as a 12-month moving average.

Leverage. The convention for dealing with **leverage** is to treat an asset as if it were fully paid for (i.e., effectively "look through" the leverage as if it weren't there). When derivatives are included, the same principle of *de-leveraging* is applied.

Risk. Hedge fund returns are usually skewed with significant leptokurtosis (fat tails), so standard deviation fails to measure the true risk of the distribution.

Downside deviation is a popular hedge-fund risk measure, as it measures only the dispersion of returns below some specified threshold return. The threshold return

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is usually either zero or the risk-free rate of return. If the threshold is a recent average return, then we call the downside deviation the **semivariance**. The point of these measures is to focus on the negative returns and not penalize a fund for high positive returns, which increase measured standard deviation.

The Sharpe Ratio

Annual hedge fund Sharpe ratios are calculated using *annualized* measures:

$$\text{Sharpe}_{\text{HF}} = \frac{\text{annualized return} - \text{annualized risk-free rate}}{\text{annualized standard deviation}}$$

In addition to concerns associated with the way returns are calculated, the Sharpe ratio has the following *limitations* with respect to hedge fund evaluation:

- *Time dependency*. The Sharpe ratio is higher for longer holding periods (e.g., monthly versus weekly returns) by a scale of the square root of time, because monthly or quarterly returns and standard deviations are annualized. For example, quarterly returns are multiplied by 4, but the quarterly standard deviation is multiplied by $\sqrt{4}$.
- *Assumes normality*.
- *Assumes liquidity*.
- *Assumes uncorrelated returns*: Returns correlated across time will artificially lower the standard deviation. For example, if returns are trending for a period of time, the measured standard deviation will be lower than what may occur in the future. Serially correlated returns also result when the asset is illiquid and current prices are not available (e.g., private equity investments).
- *Stand-alone measure*: Does not automatically consider diversification effects.

Derivative Markets

Derivatives are a **zero-sum game**. This means the gross long-term return on passively managed and unlevered portfolios should be the risk-free rate. To earn more than the risk-free rate would imply that parties in the market are willing to sacrifice return. This may be the case when hedgers effectively pay a risk-premium to have "insurance" on their cash positions (e.g., protective put).

Since not all market participants can use derivatives, investors in derivatives may be able to capture returns not available to all investors.

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Distressed Securities Investing

Long-only value investing tries to find opportunities where the prospects will improve. *High-yield investing* is buying publicly-traded, below investment grade debt. *Orphan equities investing* is the purchase of the equities of firms emerging from reorganization.

Distressed debt arbitrage is the purchasing of a company's distressed debt while short selling the company's equity. **Private equity** is an "active" approach where the investor acquires positions in the distressed company, and the investment gives some measure of control. All distressed securities can have event risk, liquidity risk, market risk, and J-factor risk.

Swaps

Cross-Reference to CFA Institute Assigned Reading #37

Commodity Swaps vs. Interest Rate Swaps

The financial **settlements** of interest rate swaps and commodity swaps are very similar:

settlement = (difference between fixed and market values) × (notional principal)

With respect to swap **valuation**, memorize the following main points:

1. Value is the present value of the settlement.
2. Values at inception are zero (ignoring fees).
3. Values change as interest rates change. In addition, the value of a commodity swap changes as commodity prices change.
4. Values change as time passes.

Forward contracts can lock in the cash flows, but the changes in the interest rates can change the present value of the cash flows and, hence, the market value of the swap.

Swap Hedging Strategies

From the perspective of the buyer of a **prepaid swap**, there is *credit risk*, *market risk*, and *financial risk*. For **financially settled swaps**, there is risk from the changes in forward prices and in interest rates, but the credit risk is considerably less.

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Commodity Forwards and Futures

Cross-Reference to CFA Institute Assigned Reading #38

The forward price (F_T) of a *financial asset* is the future value of the spot price at the risk free rate reduced by the dividend yield:

$F_{t,0} = S_0 e^{(r - \delta)T}$
S_0 = current spot price
$F_{T,0}$ = forward price at time 0 for an asset to be delivered at time T
r = risk-free rate
δ = dividend yield

The **lease rate** on a commodity is the interest rate (i.e., return) the holder of a commodity would require to lend it out, and it is analogous to the dividend yield on a stock that has been loaned out for a short sale. If we denote the lease rate as δ, the equation also applies to commodities.

$F_{t,0} = S_0 e^{(r - \delta)T}$
δ = lease rate

When there are **storage costs** associated with holding the commodity, the forward price can be stated as:

$F_{t,0} = S_0 e^{(r + \lambda)T}$
r = risk-free rate
λ = storage costs as percentage of commodity value

Note that storage costs act like a *negative lease rate*. If the owner of a storable commodity *lends* the commodity, he is relieved of paying the storage costs.

The non-monetary gain from holding a commodity is referred to as **convenience yield**. Think of the storage costs as being *reduced* by the convenience yield, so the formula for calculating the forward price with storage costs becomes:

$F_{t,0} = S_0 e^{(r + \lambda - c)T}$
r = risk-free rate
λ = storage costs as percentage of commodity value
c = convenience yield as a percentage of commodity value

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Commodity No-Arbitrage Prices

For the holder of a commodity, the *upper bound* on the arbitrage-free price can be expressed as:

$$F_{0,T} \leq S_0 e^{(R_F+\lambda)T}$$

The *lower bound* can be expressed as:

$$F_{0,T} \geq S_0 e^{(R_F+\lambda-c)T}$$

This creates a *range* of no-arbitrage prices:

$$S_0 e^{(R_F+\lambda-c)T} \leq F_{0,T} \leq S_0 e^{(R_F+\lambda)T}$$

Treating the lease payment as a dividend (for investing in the commodity), the forward price for a commodity with an active lease market is:

$$F_{0,T} \leq S_0 e^{(R_F-\delta)T}$$

δ = the lease rate = the convenience yield minus storage costs $(c-\lambda)$.

Contango and Backwardation

An upward-sloping forward curve indicates that forward prices increase as their maturity increases. The market is described as being in **contango**, which occurs when the lease rate is *less than* the risk-free rate. The market is in **backwardation** when the forward curve is downward-sloping. Backwardation occurs when the lease rate is *greater than* the risk-free rate.

Commodity Spreads

A *commodity spread* results from a commodity that is an input in the production process of other commodities. For example, a trader can create a *crush spread* by holding a long (short) position in soybeans and a short (long) position in soybean meal and soybean oil.

Similarly, petroleum can be refined to produce heating oil, kerosene, or gasoline. This process is known as "cracking" and thus, the difference in prices of crude oil, heating oil, and gasoline is known as a *crack spread*. Thus, an oil refiner could lock in the price of the crude oil input and the finished good outputs by an appropriate crack spread reflecting the refining process. However, this is not a perfect hedge

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because there are other outputs that can be produced (such as jet fuel and kerosene).

Basis Risk

In order to minimize basis risk, it is ideal to find a futures contract that is highly correlated with the hedged asset. In addition, the timing of the delivery should match the expiration of the hedge in both financial and commodity futures. Minimizing basis risk in commodity futures will, however, depend on more than just timing. Differences due to timing, grade, storage costs, and/or transportation costs can create basis risk.

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