

ALTERNATIVE INVESTMENTS

Study Session 18

EXAM FOCUS

"Alternative investments" collectively refers to the many asset classes that fall outside of the traditional definitions of stocks and bonds. This category includes mutual funds, exchange-traded funds, real estate, venture capital, hedge funds, closely held companies, distressed securities, and commodities. Each of these alternative investments has unique

characteristics that require a different approach by the analyst. You should be aware of the different risk-return profiles, tax issues, legal issues, and other advantages and disadvantages associated with each of the alternative investments discussed in this topic review.

LOS 79.a: Distinguish between an open end and a closed end fund.

Managed investment companies (mutual funds) are formed to collectively manage assets for a group of investors. Investment companies can be classified into one of two categories, depending upon the liquidity they provide or do not provide to their investors.

An open-end investment company, or **open-end fund**, stands ready to redeem shares at the closing value on any trading day. Shares of a closed-end company, or **closed-end fund**, are traded (after issuance) in the secondary markets through organized exchanges (e.g., NYSE). Thus the liquidity of an open-end fund is provided by the investment company that manages it, whereas the liquidity of a closed-end fund is determined in the open market.

The managers of an open-end fund may charge a fee, or "load," to the investors upon purchase (a front-end load) or at redemption (a back-end load). A fund that charges no fee at purchase or redemption is called a "no-load" fund. All funds, regardless of whether they are load or no-load funds, will charge ongoing fees on an annual basis, which may include management fees, administrative fees, and distribution (marketing) fees, which are referred to as 12b-1 fees in the U.S.

The shares of a closed-end fund will be issued at a small premium to the value of the underlying assets, the premium serving as compensation for issuance costs. The investment company will also charge an ongoing management fee. Since a closed-end fund is traded in the secondary market subsequent to issuance, the redemption cost for the investor is simply the commission charged on the sale of shares and a portion of the bid/ask spread of the shares. The terms "load" and "no-load" are not applicable to closed-end funds.

LOS 79.b: Explain how the net asset value of a fund is calculated.

The net asset value (NAV) of a mutual fund is the value of the investment company's assets minus its liabilities, stated on a per-share basis. The share price of an open-end fund will always equal the NAV since the investment company is obligated to redeem shares at any time at current market value. The share price of a closed-end fund may or may not equal the NAV since the share price is determined in the secondary market. The shares may trade at a premium (share price greater than NAV) or at a discount (share price less than NAV) to the actual NAV of the fund's assets.

LOS 79.c: Explain the nature of various fees charged by investment companies.

Fees charged by investment companies can generally be classified as one-time fees or ongoing annual fees. Closed-end funds initially issue shares at a premium to the value of the fund's underlying assets, which essentially is a fee paid by the investors as compensation for issuance costs. Some open-end funds will charge a load (or sales commission) upon purchase, at redemption, or both. Sometimes the back-end load amount will decrease over time in order to encourage longer investment holding periods for shareholders. Premiums, loads, and redemption fees are, in essence, compensation for the sales and marketing efforts, but they are not performance incentives for the portfolio managers.

Other fees or expenses are charged to shareholders on an annual basis. The annual fee may cover several components: management fees, which go to the portfolio manager and are typically the largest component; administrative expenses; and distribution fees which are part of overall marketing expenses (called 12b-1 fees in the U.S.). A fund's expense ratio is the ratio of operating expenses to average assets. Several investment industry groups examine expense ratios among funds in order to compare their relative operating efficiency. The expenses and fees charged by the investment companies decrease an investor's return and can have a significant effect on performance. Often, funds will have a different fee structure for different classes of shares. Different classes of shares are sold through different distribution channels. With differences in up-front, back-end, and ongoing distribution fees among the classes, an investor's anticipated holding period (time horizon) will be an important determinant of which class of shares and associated fee structure will be most advantageous.

Example: Fee structures and the investment horizon

Consider the various fee and expense structures in Figure 1.

Figure 1: Expenses for Fiduciary Fund Shares

	<i>Class A Shares</i>	<i>Class B Shares</i>	<i>Class C Shares</i>
Front-end load (charged at time of sale)	4% of Investment	none	none
Back-end load (redemption fees)	none	initially 5% of sale proceeds—declines by 1% each year	2% during the first year
Annual fees (calculated on year-end values)			
Distribution fees	none	0.5%	1.0%
Fund management fees	0.8%	0.8%	0.8%
Other fund expenses	0.2%	0.2%	0.2%
Total annual fees	1.0%	1.5%	2.0%

Assume that the gross return on an investment in the Fiduciary Fund will be constant at 9% per year. Which class of shares would you recommend to an investor with an investment horizon of:

- two years?
- five years?
- ten years?

Answer:

Assuming a 2-year holding period, the total redemption value for an assumed \$10,000 initial investment in:

Class A shares would be: $10,000 (1 - 0.04) (1.09)^2 (1 - 0.01)^2 = \$11,178.79$.

Class B shares would be: $10,000 (1.09)^2 (1 - 0.015)^2 (1 - 0.03) = \$11,181.43$.

Class C shares would be: $10,000 (1.09)^2 (1 - 0.02)^2 = \$11,410.51$.

Class C shares would provide the greatest net return.

Assuming a 5-year holding period, the total redemption value for an assumed \$10,000 initial investment in:

Class A shares would be: $10,000 (1 - 0.04)(1.09)^5 (1 - 0.01)^5 = \$14,046.87$.

Class B shares would be: $10,000 (1.09)^5 (1 - 0.015)^5 = \$14,266.38$.

Class C shares would be: $10,000 (1.09)^5 (1 - 0.02)^5 = \$13,907.94$.

Class B shares would provide the greatest net return.

Assuming a 10-year holding period, the total redemption value for an assumed \$10,000 initial investment in:

Class A shares would be: $10,000 (1 - 0.04)(1.09)^{10} (1 - 0.01)^{10} = \$20,553.61$.

Class B shares would be: $10,000 (1.09)^{10} (1 - 0.015)^{10} = \$20,352.95$.

Class C shares would be: $10,000 (1.09)^{10} (1 - 0.02)^{10} = \$19,343.08$.

Class A shares would provide the greatest net return.

Remember, closed-end funds are traded like shares of stock. There is an annual (or quarterly) fund management fee that is paid to the manager of the fund. Investors pay a stock commission when buying and when selling shares. There will also be a bid/ask spread as with any stock. This spread is typically larger for funds that are less actively traded and for funds with relatively high price volatility, just as we would expect for any publicly-traded stock.

LOS 79.d: Distinguish among style, sector, index, global, and stable value strategies in equity investment.

An investment company will define which investment strategy it aims to pursue for each equity mutual fund. There are many broadly defined strategies in equity investment:

- The **style** of an equity fund describes the basic characteristics of the underlying assets, such as growth versus value or large cap versus small cap.
- A **sector strategy** would have the investment fund concentrate its assets in a specific industry (e.g., the automobile industry).
- An **index fund** strives to match returns to those of a particular stock index, such as the S&P 500.
- A **global fund strategy** will invest in securities from all over the world, including those from the investment company's home country.
- A **stable value fund** invests in short-term government securities or other investments that can provide timely principal payments and a set interest rate.

LOS 79.e: Distinguish among exchange traded funds (ETFs), traditional mutual funds, and closed end funds.

An **exchange traded fund (ETF)** is a special type of fund that invests in a portfolio of stocks or bonds and is designed to mimic the performance of a specified index. Shares are traded in the secondary market like the shares of a closed-end fund, with the investor having the ability to trade at any time during market hours, sell short, or margin the shares. Although they trade shares of a closed-end fund, the legal structure of most ETFs in the U.S.

is that of a traditional (open-end) mutual fund. The creation and redemption of shares is somewhat different, however, as is detailed later.

A feature unique to ETFs is their use of “in-kind” creation and redemption of shares. Exchange specialists, called authorized participants, are established by the fund to ensure an efficient, orderly market in the shares. Authorized participants can create new shares in the ETF by depositing with a trustee a portfolio of stocks that track the index. The authorized participant then receives from the trustee new ETF shares to be sold in the open market. Conversely, the authorized participant can redeem shares to the trustee in exchange for the underlying stocks.

The “in-kind” process used by ETFs has two primary advantages. First, the in-kind creation and redemption feature keeps market prices of ETF shares close to NAV and avoids the premiums and discounts typical for closed-end funds. It provides a mechanism for arbitrage by exchange participants between the shares of stock that make up the fund and shares of the fund. Second, there is a tax advantage to in-kind redemption. If the fund distributes shares as a redemption method, any capital gains on the shares are realized at their sale. It is not a capital gain to the fund, so existing fund shareholders do not incur a tax liability as they would when a traditional mutual fund redeems fund shares and must sell portfolio securities to meet the cash demand. While fund shareholders do have the right to cash redemption, it is discouraged by redemption fees and the fact that NAV for the redemption is calculated some days after the redemption request.

LOS 79.f: Explain the advantages and risks of ETFs.

Advantages of ETFs. The broad spectrum of ETFs may have some of the following advantages relative to other equity investments:

- ETFs provide an efficient method of diversification—one transaction yields exposure to a broad index or sector.
- ETFs trade in a similar fashion to traditional equity investments—through an exchange—and can be shorted or margined. ETFs can be traded throughout the day with continuously updated prices, unlike traditional open-end funds that trade once a day at prices determined at the close of market.
- Some ETFs are patterned after indexes that have active futures and option markets, allowing for better risk management.
- ETF investors know the exact composition of the fund at all times through a daily, published list of underlying assets.
- Because they are passively managed, ETFs typically have very efficient operating expense ratios, as well as no loads to purchase or redeem shares (just a normal commission) and a bid-ask spread.
- The use of “in-kind” creation and redemption of shares eliminates any trading at a discount or premium to NAV. Authorized participants can create or redeem shares to capture any arbitrage opportunities.
- Decreased capital gains tax liability for ETF shareholders compared to traditional open-end fund investors.
- For some ETFs, dividends received may be reinvested immediately, as opposed to index funds whose timing may be delayed.

Disadvantages of ETFs. The disadvantages with investing in ETFs are as follows:

- In some countries outside of the U.S., there are fewer indices for ETFs to track, resulting in mid- or low-cap stocks not being well represented in the portfolio.
- The ability to trade ETFs intraday may not be significant to those investors with longer time horizons.
- Investors may encounter inefficient markets (large bid-ask spreads) in those ETFs with low trading volume.
- Larger investors may choose to directly invest in an index portfolio, resulting in lower expenses and lower tax consequences.

Risks of ETFs. The major risks associated with ETFs are somewhat applicable to all equity investments and may not apply to the same extent to all ETFs:

- Shareholders of ETFs are exposed to the market risk of the index tracked by the fund.
- An ETF may invest in only a particular portion of the market, thus subjecting investors to asset class or sector risk.
- Trading prices of ETFs can differ from NAV, depending upon depth and liquidity of the market.
- Like traditional index funds, ETFs may experience tracking error risk, where the portfolio is not identical to the benchmark index and thus does not perform identically to the index.
- Some ETFs that are able to purchase derivatives, such as futures contracts on the underlying index, are exposed to additional risk from the increased leverage as well as credit risk on the derivatives.
- Currency and country risk may be present in ETFs that are based on international indexes.

LOS 79.g: Describe the forms of real estate investment and explain their characteristics as an investable asset class.

Types of real estate investments. For investors, real estate is one of the most common tangible assets they can readily invest in. Other types of investments, such as stocks and bonds, are claims to intangible assets (i.e., future cash flows), represented by some form of documentation. Real estate as an asset class is broadly defined as land plus any permanently attached fixture. Each real estate property is unique, causing difficulty in accurately determining current market value. Real estate as an investment is fairly illiquid, resulting in higher transaction costs than other types of investments. Real estate investments can be categorized into one of four major groups:

- **Outright ownership** (sometimes called “fee simple”). This is the most straightforward form of ownership, which entitles the holder to full ownership rights for an indefinite time period.
- **Leveraged equity position.** Investors have the same entitlements as those having outright ownership but with the addition of some type of loan with terms that must be met in order to maintain ownership.
- **Mortgages.** The investor is the holder of a mortgage loan and receives the monthly principal and interest payments paid by a borrower. This is considered to be a form of real estate investment because the underlying real estate may revert to the mortgage investor if the borrower defaults on the mortgage. Investors may choose to diversify their real estate exposure by investing in a group or pool of mortgage loans.
- **Aggregation vehicles.** These allow investors to increase diversification in direct real estate holdings by investing in groups of real estate projects. Common forms include real estate limited partnerships, commingled funds, and real estate investment trusts (REITs).

There are several characteristics unique to real estate that differ from other asset classes. A real estate investment is immobile, not divisible, and unique from all other real estate properties. Since each property is unique, it is impossible to directly compare to other properties, making it difficult to determine true market value. For these reasons, real estate as an asset class is somewhat illiquid.

When considering real estate in a portfolio context as an asset that can provide diversification benefits, there are some important issues to consider. A primary issue is the characteristics of the data used and their effect on real estate’s expected return, standard deviation of returns, and the correlation with the returns of other investable asset classes.

Some indexes based on real estate performance are based on appraised values for the real estate. Frank Russell Company (FRC) and the National Council of Real Estate Investment Fiduciaries (NCREIF) both produce indexes of regional real estate performance that are based on appraised values. The use of appraised values tends to smooth the returns of appraisal-based indexes relative to market prices. In portfolio optimization models, appraisal-based indexes will tend to have very large weights because of their low volatility and low correlation with important asset-class proxies such as the S&P 500 stock index. Many analysts consider this a very serious drawback of appraisal-based indexes and consider their use in portfolio mean-variance optimization models to be inappropriate.

Other real estate indexes are based on the performance of the shares of Real Estate Investment Trusts (REITs). The National Association of Real Estate Investment Trusts (NAREIT) index is one example. REIT indexes tend

to have returns volatilities very close to those of broad stock market indexes, such as the S&P 500 stock index. Correlations of REIT index returns with stock index returns are very close to one as well. The implication of these results is that portfolio diversification benefits of REITs as an asset class are likely quite small. Another thing to consider is that REIT index returns reflect the leverage used in the REITs that comprise the index, so the actual returns behavior of the underlying real estate is not what is being measured.

In a portfolio context, the ability of real estate investments to provide a hedge against inflation may be a primary concern. In this case, the type of real estate may be the most important consideration, since some types of income producing real estate have much greater ability to pass through price inflation over the short term than others.

LOS 79.h: Describe the various approaches to the valuation of real estate.

Investors may use one or more of the four common methods to value real estate:

- With the **cost method**, value is determined by the replacement cost of improvements plus an estimate for the value of the land. The replacement cost is relatively easy to determine using current construction costs, but the valuation of the land may not be easily determined. Also, the market value of an existing property may differ significantly from its replacement cost, depending upon the current condition of the improvements.
- The **sales comparison method** uses the price of a similar property or properties from recent transactions. Prices from other properties must be adjusted for changes in market conditions and for characteristics unique to each property. This approach cannot be used in an illiquid market without recent comparable sales. A more detailed method of the sales comparison approach is hedonic price estimation, where specific characteristics of a property are quantified and then the sales prices for all recent transactions are put into a regression model that determines a benchmark value of each of the characteristics.
- The **income method** uses a discounted cash flow model to estimate the present value of the future income produced by the property. The **net operating income (NOI)** is a simplified estimate based on annual gross rental revenues minus operating expenses. The NOI is then divided by an estimated market required rate of return, resulting in an appraisal price. This approach ignores changes in NOI that may occur over time and also does not take into account investors' income tax implications.
- The **discounted after-tax cash flow model** links the value of a property to an investor's specific marginal tax rate. The net present value of an investment equals the present value of after-tax cash flows, discounted at the investor's required rate of return, minus the equity portion of the investment. Only those projects with a positive expected net present value would make financial sense.

Professor's Note: When we are calculating after-tax cash flow, after-tax refers to the investor's marginal tax rate.

LOS 79.i: Calculate the net operating income (NOI) from a real estate investment.

NOI is defined as the gross operating income less estimated vacancy, collections, and other operating expenses.

Example: Real estate NOI

An investor is considering the purchase of a small office building and, as part of his analysis, must calculate the NOI. The information on the building is as follows:

Gross potential rental income:	\$250,000
Estimated vacancy and collection loss rate:	5%
Insurance:	\$10,000
Taxes:	\$8,000
Utilities:	\$7,000
Maintenance:	\$15,000

Answer:

$$\text{NOI} = \$250,000 - (\$250,000 \times 0.05) - \$10,000 - \$8,000 - \$7,000 - \$15,000 = \$197,500$$

Professor's Note: Be aware that depreciation and financing costs are not factors in the calculation of NOI. It is assumed that maintenance will keep the property in good condition, and the value of the property is independent of any financing arrangements. Also note that the taxes that are relevant to the calculation of NOI for real estate are property taxes.

LOS 79.j: Calculate the value of a property using the sales comparison and income approaches.

The sales comparison approach is based on sales prices of comparable properties. Valuation can then be done relative to a specific similar property or relative to a benchmark such as the mean or median home price in the area. Then additions (e.g., for more square feet) and subtractions (e.g., for poor locations) are made to estimate the value of the subject property.

Another approach under the general heading of sales comparison methods (hedonic price estimation) involves regressing the sales prices of properties on the key property characteristics that influence the value of a property. The slope coefficients estimated by the regression can then be used to estimate the value of the subject property. The regression equation is used like any multiple regression model—the values of the independent (right-hand side) variables for the subject property are multiplied by the estimated slope coefficients to estimate its value.

The income approach is based on taking the present value of the stream of annual NOI, assuming it is an infinite stream, using the required rate of return or “cap rate” estimated for the property. These approaches are illustrated in the following two examples.

Example: Real estate valuation

Continuing the previous example, the investor has obtained additional information regarding other recent sales of comparable office buildings in the vicinity. The investor can use the comparable sales information in a hedonic price model to estimate a current appraised value of the property. Assuming a current market cap rate of 10%, compute the value of the property using (1) the sales comparison approach and (2) the income approach.

Characteristics	Units	Slope Coefficient in \$ per Unit
Proximity to downtown	In miles	–50,000
Vacancy rate	Percentage	–35,000
Building size	Square feet	40

The potential investment is half a mile from downtown, has an estimated vacancy rate of 4%, and is 50,000 square feet.

Answer 1: Sales comparison approach

Using the price model, the estimated appraised value would be:

$$\text{value} = (-50,000 \times 0.5) + (-35,000 \times 0.04) + (40 \times 50,000) = \$1,973,600$$

Answer 2: Income approach

Using the income approach, the appraised value of the property equals the NOI divided by the market cap rate and can be calculated as:

$$\text{appraisal price} = \frac{\text{NOI}}{\text{market cap rate}} = \frac{\$197,500}{0.10} = \$1,975,000$$

LOS 79.k: Calculate the after-tax cash flows, net present value, and yield of a real estate investment.

Example: Computing after-tax cash flows, NPV, and yield for real estate

Continuing the previous example, assume the investor purchases the building for \$1,850,000, putting down 20% cash and financing the remainder with a long-term mortgage at a rate of 10%. The annual payments on the mortgage are \$156,997, and the interest portion is fully deductible for income tax purposes. The investor's marginal income tax rate is 28%. Depreciation per year, using the straight-line method, is estimated to be \$45,000 per year. Calculate the after-tax cash flows, net present value, and the yield of the investment.

Answer:

After-tax cash flow: The first year's interest payment of \$148,000 is calculated as the amount borrowed (\$1,480,000) times the interest rate of the loan. After-tax net income (NOI less depreciation, less interest, net of taxes) is $(\$197,500 - 45,000 - 148,000) \times (1 - 0.28) = \$3,240$. After-tax cash flow can be determined by adding depreciation back to and subtracting the principal component of the mortgage payment from the after-tax net income number. For this investment, the year 1 after-tax cash flow is $\$3,240 + \$45,000 - \$8,997 = \$39,243$.

Net present value: Three years forward, the investor plans to sell the building for \$1,950,000. The remaining mortgage balance at payoff is \$1,450,000. Assume that the cost of equity is 10% and the net cash flows for the investment are as follows:

Year 1:	\$39,243	
Year 2:	\$38,991	
Year 3:	\$538,721	(year of sale, net of mortgage payoff, no capital gains tax)

The present value of the cash flows is:

$$\frac{\$39,243}{1.10} + \frac{\$38,991}{1.10^2} + \frac{\$538,721}{1.10^3} = \$472,649$$

The NPV is the present value of the cash flows minus the initial investment:

$$\$472,649 - \$370,000 = \$102,649$$

Yield: In summary, the cash flows of the investment are:

Year 0	-\$370,000	=	CF ₀
Year 1	\$39,243	=	CF ₀₁
Year 2	\$38,991	=	CF ₀₂
Year 3	\$538,721	=	CF ₀₃
CPT → IRR		=	20.18%

LOS 79.l: Explain the various stages in venture capital investing.

Venture capital investments are private, non-exchange-traded equity investments in a business venture. Investments are usually made through limited partnerships, with investors anticipating relatively high returns in

exchange for the illiquidity and high-risk profile of a venture capital investment. Investments may be made at any point of the business cycle of the company, from the initial planning stages of a new venture to an established firm ready to go public.

The stages of venture capital investing, which overlap somewhat, are as follows:

- *Seed stage.* Investors are providing capital in the earliest stage of the business and may help fund research and development of product ideas.
- *Early stage.* Early stage financing includes:
 - *Start-up financing*, which typically refers to capital used to complete product development and fund initial markets.
 - *First stage financing*, which refers to the funding of the transition to commercial production and sales of the product.
- *Formative stage.* Broad category that encompasses the seed stage and early stage.
- *Later stage.* Marketable goods are in production and sales efforts are underway, but the company is still privately held. Within the later stage period, *second-stage investing* describes investments in a company that is producing and selling a product but is not yet generating income. *Third-stage financing* would fund a major expansion of the company. *Mezzanine or bridge financing* would enable a company to take the steps necessary to go public.

Broad terms, such as “expansion stage financing,” are used to describe the second and third stage, while the term “balanced stage” covers all stages, from seed through later stage.

LOS 79.m: Discuss venture capital investment characteristics and the challenges to venture capital valuation and performance measurement.

Venture capital investment characteristics (may have some or all of the following):

- *Illiquidity.* Investors’ ability to cash out is dependent upon a successful IPO, which probably will not occur in the short term, if ever.
- *Long-term investment horizon.* Market conditions must be conducive for a public offering, and the company most likely must be at a profitable point in order for investors to recognize returns on their investment.
- *Difficulty in valuation.* Because of the uniqueness of each investment, there are few comparable assets with meaningful trading volume available for market value comparisons.
- *Limited data.* There is not much comparable historical risk and return data, nor is there much information on which to base future cash flows and earnings estimates. There also is insufficient information on what competing ideas or products other entrepreneurs may be developing.
- *Entrepreneurial/management mismatches.* Entrepreneurs with good ideas don’t always necessarily evolve into good managers as their company grows.
- *Fund manager incentive mistakes.* The primary incentive for fund managers must be performance, not size or some other criteria.
- *Timing in the business cycle.* Market conditions are a primary determinant of the timing of market entrance and exit strategies.
- *Requirement for extensive operations analysis.* A successful venture capital manager must act as both a financial and operations advisor to the venture.

Valuing and measuring the performance of a venture capital investment is tricky at best, due to the large probability of failure plus the overall uncertainty as to amount and timing of cash flows. The three most important factors that must be assessed are the expected payoff at exit, timing of exit, and the probability of failure. Prior to exit (or failure), evaluation of the venture’s performance must be made, although precise measurement is challenging. Difficulties include deriving accurate valuations, establishing benchmarks, and lacking reliable performance measures.

LOS 79.n: Calculate the net present value (NPV) of a venture capital project, given the project's possible payoff and conditional failure probabilities.

Example: Computing NPV for a venture capital opportunity

A venture capital fund manager is considering investing \$2,500,000 in a new project that he believes will pay \$12,000,000 at the end of five years. The cost of equity for the investor is 15%, and the estimated probability of failure is presented in Figure 1. These are conditional probabilities since they represent the probability of failure in year N, given that the firm has survived to year N.

Figure 2: Estimated Probability of Failure

Year	1	2	3	4	5
Failure probability	0.20	0.20	0.17	0.15	0.15

Calculate the NPV of the potential investment.

Answer:

The probability that the venture survives for five years is calculated as:

$$(1 - 0.20)(1 - 0.20)(1 - 0.17)(1 - 0.15)(1 - 0.15) = 0.3838 = 38.38\%$$

Under the original assumptions that the investment pays \$12,000,000 at the end of year 5, the NPV of a successful project is $-\$2,500,000 + (\$12,000,000 / 1.15^5) = \$3,466,121$. The NPV of the project if it fails is $-\$2,500,000$. The expected NPV of the project is a probability-weighted average of the two possible outcomes:

$$(0.3838 \times \$3,466,121) + (0.6162 \times -\$2,500,000) = -\$210,203$$

The fund manager would not invest in the new project due to the negative expected NPV.

LOS 79.o: Discuss the descriptive accuracy of the term “hedge fund,” define hedge fund in terms of objectives, legal structure, and fee structure, and describe the various classifications of hedge funds.

Hedge funds today utilize a wide variety of strategies, which *may or may not utilize hedging techniques to reduce or eliminate risk*. The term “hedge fund” does not begin to describe this broad asset class that has evolved over the past two decades. The common objective of hedge funds is that they strive for absolute returns. That is to say that hedge funds are not constrained by the fact that they must perform relative to some specific benchmark or index and simply seek to maximize returns in all market scenarios.

Most hedge funds are in the form of either a limited partnership, a limited liability corporation, or an offshore corporation. In the U.S., limited partnerships that abide by certain guidelines (regarding the maximum allowable number of investors, the “qualifications” of the investors, and the prohibition of advertising) are exempt from most SEC regulations. Because the number of investors is limited, the amount of their individual investments is relatively large, usually \$200,000 or more.

The manager of the fund receives compensation that is comprised of two components. The base fee is typically around 1% of assets, and the manager receives this fee regardless of performance of the hedge fund. The second component, the incentive fee, is paid based on the actual returns of the fund. Some structures allow the manager to participate in all returns, while other structures pay the manager only if performance exceeds a target return, such as the risk-free rate.

Sometimes an additional provision allows incentive fees to be paid only after the fund has produced returns in excess of any negative returns from the previous year. A “high watermark provision” is sometimes included, which stipulates that incentive fees are only based on returns above the highest value achieved over the life of the fund. Provisions such as these may encourage the fund manager to take additional risk after periods of negative returns because of the option-like characteristics of the manager’s incentive payment.

Classifications of Hedge Funds

Hedge funds can usually be classified by investment strategy; however, there is a great deal of overlap among categories. Some hedge fund classifications are:

- *Long/short funds* make up the largest category of hedge funds in terms of asset size. These funds take long and short common stock positions, use leverage, and are invested in markets worldwide. By definition they are not market-neutral but seek to profit from greater returns on the long positions than on the short positions.
- *Market-neutral funds* are a type of long/short fund that strive to hedge against general market moves. Managers may try to achieve this through any of several strategies, some involving derivatives. The fund may still have long and short positions, but the positions will offset each other so that the effect is a net zero exposure to the market.
- *Global macro funds* make bets on the direction of a market, currency, interest rate, or some other factor. Global macro funds are typically highly leveraged and rely heavily upon derivatives.
- *Event-driven funds* strive to capitalize on some unique opportunity in the market. This may involve investing in a distressed company or in a potential merger and acquisition situation.

LOS 79.p: Discuss the benefits and drawbacks to fund of funds investing.

Fund of funds investing involves creating a fund open to both individuals and institutional investors, which in turn invests in hedge funds.

Benefits. Funds of funds enable investors with limited capital to invest in a portfolio of hedge funds. Likewise, investors with more capital can diversify their holdings by investing in several hedge funds via a fund of funds for roughly the same amount required for directly investing in a single hedge fund. Fund of funds investing may grant new investors access to hedge funds that might otherwise be closed to them due to limitations on the number of investors. A fund of funds manager will have the expertise necessary to choose high-quality hedge funds and will also perform the due diligence required by investing in hedge funds.

Drawbacks. Fund of funds managers charge a management fee in addition to those fees already charged by the hedge fund manager. Diversification among hedge funds will decrease the investor’s risk but most likely his return as well, from which additional fees must be subtracted. Fund of funds managers may or may not deliver returns superior to what an investor might achieve by selecting her own hedge funds.

LOS 79.q: Discuss the leverage and unique risks of hedge funds.

The majority of hedge fund managers utilize some form of leverage in order to enhance returns. Some arbitrage opportunities may have such a small return that leverage is necessary to make the strategy meaningful. However, leveraged positions can sometimes backfire and cause losses to be magnified. Hedge funds typically limit the amount of leverage that can be used, and fund managers are legally required to operate within the limit. One way a hedge fund can increase its leverage is by borrowing through a margin account. Also, a hedge fund manager could borrow external funds to either buy more assets or sell short more than the equity in the fund. A third way is for hedge fund managers to utilize those securities that only require posting margin versus trading in cash securities requiring full payment.

Risks associated with hedge funds include:

- *Illiquidity.* Investing in those markets with little liquidity, such as derivatives, decreases a hedge fund's trading flexibility.
- *Potential for mispricing.* Investments in esoteric securities that trade infrequently may lead to difficulty in determining true current market value. Broker-dealers who are financing such securities tend to be conservative in their valuations, thereby increasing the amount of cash that is required to be posted by the hedge fund.
- *Counterparty credit risk.* A broker-dealer is involved in almost every transaction a hedge fund enters into, thereby creating significant counterparty risk to the hedge fund.
- *Settlement errors.* Hedge funds bear the risk that the counterparty will fail to deliver a security as agreed on settlement day.
- *Short covering.* Short selling is a component of many common hedge fund strategies. Hedge fund managers run the risk that they will have to cover their shorts and repurchase securities at a price higher than where they originally sold.
- *Margin calls.* Margin calls on an already highly leveraged position can result in forced selling of assets, possibly at a loss.

LOS 79.r: Discuss the performance of hedge funds, the biases present in hedge fund performance measurement, and explain the effect of survivorship bias on the reported return and risk measures for a hedge fund data base.

There are numerous hedge fund indices designed to measure historical performance; however, they may not provide much meaningful information on hedge funds as an asset class because each hedge fund's structure is so unique. Since hedge funds are not legally required to publicly disclose performance, only those hedge funds that elect to disclose performance information are included in the indices. Some general conclusions regarding hedge funds can be derived.

- Hedge funds, as a class, have historically outperformed both U.S. equity and bond market benchmarks (S&P 500 and Lehman Brothers Government/Corporate Bond Index).
- Hedge funds have demonstrated a lower risk profile than traditional equity investments as measured by standard deviation.
- In recent years, the Sharpe ratio, which is a reward-to-risk ratio, has been consistently higher for hedge funds than for most equity investments and has been comparable to that of fixed-income investments.
- There is a low correlation between the performance of hedge funds and conventional investments.

As with the evaluation of historical data for any investment instrument, certain **biases may exist** that should be considered. It is common investment knowledge that past performance is not a reliable indicator of future performance. Some significant biases are:

- *"Cherry picking" by managers.* The only information available to be included in the indices is what the fund managers submit. Managers may be unwilling to disclose poor performance and choose to offer information only on those funds with successful track records. The index may overestimate returns for the hedge fund industry as a whole.
- *Incomplete historical data.* Again, because disclosure is voluntary, only fund managers with a respectable track record would be willing to be included in an index. Past performance of the industry is inflated by an index because poor past performance is excluded.
- *Survival of the fittest.* As with any industry, only the fittest hedge funds survive. By design, an index only includes ongoing funds and excludes those that have failed. The index in effect is biased toward only the "success stories" of the industry.
- *Smoothed pricing.* Because many of the assets held in hedge funds are not actively traded, managers rely upon broker-dealers to mark their positions and estimate "market" value. Because they are estimates and not based upon actual transactions, values tend to be more stable over time, thereby reducing reported volatility.

- *Asymmetrical returns.* Some investment strategies used by hedge funds may have a limited upside potential but unlimited downside potential. Traditional risk measures, such as standard deviation or value at risk, do not fully account for this asymmetric return profile.
- *Fee structures and incentives.* A typical hedge fund fee structure pays the manager a small fixed fee and then a substantial percentage of gains. This structure may cause fund managers to take big risks, especially if past performance is bad and they have “nothing to lose.”

Effect of Survivorship Bias

The effect of survivorship bias is greater for a hedge fund database than for other asset classes because of the lack of required reporting standards in the industry. Hedge funds are normally exempt from SEC regulations regarding reporting and only publicly disclose performance information on a voluntary basis. Fund managers tend to “cherry pick” the information they choose to release, reporting on their more successful funds while not providing information on poorly performing or defunct funds. Reported returns for a hedge fund database are therefore overstating performance because of survivorship bias.

Survivorship bias has the opposite effect on the risk measures of a hedge fund database. Hedge funds with highly volatile returns tend to fail more frequently, and defunct funds are not generally included in the database. Because the database would only include the more stable funds that have survived, the risk measure of hedge funds as an asset class would be understated.

LOS 79.s: Explain how the legal environment affects the valuation of closely held companies.

Legal issues. The equity shares of closely held companies are not publicly traded and are not subject to the same SEC regulations as public companies regarding reporting and disclosure. As the name implies, closely held companies are held by a relatively small group of owners. The companies may be in the form of any number of legal entities: corporations, partnerships, or sole proprietorships. Some corporations’ legal structures are designed to take advantage of current tax codes, such as subchapter S corporations. Other corporations may elect to operate as general or limited partnerships, which dictate the extent of a partner’s liability for the corporation. The choice of structure affects the investors’ rights and responsibilities and, ultimately, the value of their investments.

When litigation situations arise, there can be questions as to the “value” of the corporation. The legal definitions of intrinsic value, fundamental value, and fair value can differ among jurisdictions. There are not frequent transactions in the open market upon which to estimate value. Valuation, therefore, is based upon either a forecast of future cash flows, actual past cash flows, or a combination of both. Both the purpose of the valuation and the legal jurisdiction affect the factors on which value is based and how it is calculated.

LOS 79.t: Describe alternative valuation methods for closely held companies and distinguish among the bases for the discounts and premiums for these companies.

Valuation. There are three different valuation methods for closely held companies:

- **The cost approach.** What is the cost today to replace the company’s assets in their present state?
- **The comparables approach.** What is the value relative to an appropriate benchmark value? The benchmark would be based upon market prices of similar companies, adjusted for such factors as transaction date and any unique characteristics of the company. The benchmark may be difficult to establish if no comparable companies have been sold recently.
- **The income approach.** What is the net present value of the company based upon discounted future cash flows?

When valuing closely held companies, lack of liquidity and lack of marketability can both be important factors. Value can be determined by analyzing operationally similar publicly traded companies to establish a base value,

to which the liquidity and marketability discounts can be applied. Another factor to be considered is whether the block of shares being valued represents a controlling interest in the company. A discount for minority interest may be necessary for valuing a position that lacks the ability to influence corporate decision making if the benchmark value is for a controlling interest in a private company. Likewise, a premium would be appropriate for the valuation of a controlling ownership position if the benchmark value is for publicly traded shares, which represent a minority interest.

The application of premiums and discounts depends on the characteristics of the subject securities relative to the characteristics of the securities used in estimating the base value. If the base value used is the market price of publicly traded shares, the valuation of a majority interest in a closely held company may require the application of discounts for lack of liquidity and marketability and of a premium for control, for example.

LOS 79.u: Discuss distressed securities investing and the similarities between venture capital investing and distressed securities investing.

When companies are on the brink of bankruptcy or have already filed for bankruptcy protection, their securities are considered “distressed.” Also included in the group of distressed securities are those companies attempting to avoid bankruptcy by pursuing an out-of-court debt restructuring. In a typical bankruptcy scenario, the original holders of the company’s debt negotiate for an equity position in the new, restructured corporation. The original equity shareholders then receive a somewhat diluted equity position in the reorganized company. A typical distressed security investment strategy would be to purchase the debt of the struggling company, pre-reorganization, in the hopes of ultimately owning an equity position in a new, revitalized operation. Pursuing a distressed security strategy is somewhat similar to venture capital investing. Both asset classes are illiquid, have a long expected investment horizon, and require heavy involvement by investors in order to be successful. Both situations mandate extensive analytical work in order to avoid pricing or valuation mistakes.

LOS 79.v: Discuss the role of commodities as a vehicle for investing in production and consumption.

Investing in commodities gives an investor exposure to an economy’s production and consumption growth. When the economy experiences growth, the demand for commodities increases, and price increases are likely. When housing starts to increase, the demand for lumber will increase; when automobile sales are high, the demand for steel is likely high as well. During recessions, commodity prices are likely to fall with decreased demand. Overall, swings in commodity prices are likely to be larger than changes in finished goods prices.

LOS 79.w: Discuss the motivation for investing in commodities, commodities derivatives, and commodity-linked securities.

The motivation for investing in commodities may be as an inflation hedge for hedging purposes or for speculation on the direction of commodity prices over the near term. Most investors do not invest directly in commodities that need to be transported and stored. *Passive investors* who hold commodities as an asset class for diversification or those who hold commodities as a long-term inflation hedge are more likely to invest in a collateralized futures position. A collateralized futures position or collateralized futures fund is a combination of an investment in commodity futures and an investment in Treasury securities equal in value to the value of the futures position. *Active investors* may invest in commodity futures in an attempt to profit from economic growth that is associated with higher commodity prices.

Commodity-linked equity investments also provide exposure to commodity price changes. Shares of commodity-producing companies are likely to experience returns that are strongly tied to the prices of the commodities produced. This may be especially true for the shares of smaller, less diversified commodity producing firms.

Commodity-linked bonds provide income as well as exposure to commodity price changes since the overall return is based on the price of a single commodity such as gold or oil. Other commodity-linked bonds are linked to inflation through payments based on inflation or a commodity price index. These bonds may be attractive to a

fixed-income portfolio manager who wants exposure to commodity price changes but cannot invest either directly in commodities or in derivative securities.

LOS 79.x: Discuss the sources of return on a collateralized commodity futures position.

Establishing a collateralized commodities futures position requires simultaneously purchasing a specific futures contract and the amount of government securities equal to the *value* (not the purchase price) of the futures contract. The total return on this strategy will equal the change in price of the futures contract plus the interest earned on the government securities.

Example: Commodity futures returns

A passive manager purchases a position worth \$50 million in underlying value of a futures contract. The manager also buys \$50 million worth of 10-year notes that pay an interest rate of 5%. Compute the gain in the value of the position if, at the end of one month, the futures contract position is worth \$51 million and the price of the 10-year notes is unchanged.

Answer:

$$\text{gain on the futures position} = \$1,000,000$$

$$\text{interest earned on the notes} = \$50,000,000 \times 0.05 \times \frac{30}{360} = \$208,333.33$$

$$\text{total gain} = \$1,000,000 + \$208,333.33 = \$1,208,333.33$$

KEY CONCEPTS

1. An open-end fund will create new shares upon purchase or redeem existing shares for cash; a closed-end fund has a fixed number of shares that trade like shares of stock.
2. The NAV of investment company (mutual fund) shares is the value, at a point in time, of fund assets minus fund liabilities divided by the number of shares outstanding.
3. Mutual funds have ongoing management fees, administrative fees, and possibly marketing fees, all of which can significantly affect fund performance.
4. The strategies of investment company portfolios can be categorized as style (e.g., growth), sector (e.g., biotech), index (e.g., S&P 500 Index), global (all countries of the world), and stable value (e.g., short-term U.S. government securities).
5. An ETF holds a portfolio that matches a specific published index, and ETF shares are traded like closed-end fund shares. ETF shares can be traded intraday, can be shorted, have provisions for creation or redemption of shares that keep premiums and discounts to NAV at a minimum, and have low expenses.
6. Forms of real estate investment are outright ownership, leveraged equity positions, mortgages, and aggregation vehicles such as limited partnerships and REITs.
7. Real estate is immobile, indivisible, and somewhat illiquid, and each property is unique, making valuation difficult.
8. Approaches to real estate valuation are the cost method, the sales comparison method, the income method, and the discounted after-tax cash flow model.
9. NOI for a real estate investment is calculated as follows:

$$\text{NOI} = \text{gross potential income} - \text{vacancy and collection loss rate} - \text{insurance} - \text{real estate taxes} - \text{utility expense} - \text{estimated maintenance expense}$$
10. The sales comparison method of real estate valuation begins with recent sales prices for comparable properties and makes adjustments for differences; the income approach begins with a calculation of NOI and divides by the required rate of return (the cap rate).
11. With the after-tax cash flow model, annual NOI is adjusted for financing flows and computed on an after-tax basis using the investor's marginal tax rate. The net present value of the investment is the present value of these after-tax cash flows based on the required rate of return, and the yield of the investment is the IRR of the after-tax cash flows based on the purchase price of the property.
12. The stages of venture capital investing are the seed stage, the early stage, the formative stage, and later stages (after the company is making and selling a product). These later stages are alternatively called second stage, third stage (to fund a major expansion), or mezzanine/bridge financing (in preparation for an IPO).
13. Venture capital investments are illiquid, have long horizons, and are difficult to value due to problems in estimating the probability of failure, the payoff at exit, and the timing of the exit (sale or IPO of the firm).
14. The NPV of a venture capital investment can be estimated as the difference between the original investment amount and the present value of the estimated payment at exit multiplied by 1 minus the probability of failure for each year of the assumed holding period.
15. Hedge funds are typically structured as partnerships, are exempt from SEC regulation, have an absolute return objective, and charge a performance-based management fee. Many have no hedging objective or strategy.
16. Some major hedge fund categories are long/short (to benefit from overpriced securities), market neutral (to hedge market risk), global macro (to profit from trending factors), and event-driven (to exploit unique opportunities).
17. Fund of funds investing allows an investor to gain diversification across funds and styles and provides professional fund selection but is also more costly in terms of overall management fees.
18. Many hedge funds use leverage to magnify the gains (and losses) from their strategies, and hedge fund investments have additional risks from illiquidity, counterparty risk, pricing/valuation problems, settlement errors, and possible margin calls.
19. Hedge funds have historically exhibited lower standard deviations, higher returns, and higher Sharpe ratios than traditional equity investments, as well as low correlations of returns with those of conventional asset classes.

20. Hedge fund performance figures may be biased upward because of “cherry picking,” incomplete data, survivorship bias, fee structures, asymmetrical returns distributions, and the use of estimated market values.
21. Databases of hedge fund performance that contain only surviving hedge funds will provide performance statistics that are biased upward (poor performing funds tend to cease to exist) and risk measures that are biased downwards (funds that employ riskier strategies are more likely to cease to exist).
22. The legal structure of a closely held investment (e.g., S corporation or partnership), the absence of SEC reporting requirements, the purpose of the analysis, and the valuation methods accepted in its specific legal jurisdiction can all affect the valuation of closely held companies.
23. The valuation of closely held companies can be done by the cost method, the comparables method, and the income approach. Discounts for lack of liquidity, for lack of marketability, or for a minority position, and a premium for controlling interest are applied when the characteristics of the subject security differ in these dimensions from the characteristics of the securities used to establish a base value.
24. Investing in distressed securities is like venture capital investing in that the investments are often illiquid, have a long time horizon, require extensive valuation analysis, and can require active participation in dealing with management or with a court-appointed trustee in the case of a firm in bankruptcy reorganization.
25. Indirect investment in commodities can be achieved through futures, commodity-linked bonds, and the shares of commodity-producing firms in order to gain exposure to commodity price gains associated with higher economic growth.
26. While a passive investor may invest in commodities for diversification benefits through a collateralized futures fund, an active investor seeks to profit from anticipating moves in commodity prices and is more likely to use futures. Commodity-linked securities are used by investors who want exposure to commodity price moves for either hedging or speculation.
27. A collateralized commodity futures position involves investing in the futures along with an investment in Treasury securities equal to the value of the futures contract and will have returns from commodity price changes and from the interest income of the Treasury position.

CONCEPT CHECKERS: ALTERNATIVE INVESTMENTS

1. What is the NAV for the ABC fund, given the following information?
 - Assets \$250,000,000
 - Liabilities \$25,000,000
 - Shares outstanding 10,500,000
 - Base management fee 0.75%

A. \$21.43.
B. \$23.81.
C. \$225,000,000.
D. \$250,000,000.
2. An investor is considering purchasing shares of the ABC fund that has an NAV equal to \$21.25. Given that the current market price is \$22.50, which of the following statements is TRUE?

A. ABC is an open-end fund.
B. ABC charges a front-end load.
C. The investor can purchase shares of the ABC fund at a discount to NAV.
D. The investor can purchase shares of the ABC fund at a premium to NAV.
3. An investment company that invests primarily in stocks with high price-to-earnings ratios is pursuing a:

A. style strategy.
B. sector strategy.
C. global strategy.
D. stable-value strategy.
4. An important benefit of an exchange-traded fund's creation and redemption process is that it:

A. provides diversification to shareholders.
B. increases liquidity for investment company managers.
C. provides capital gains tax relief to existing shareholders.
D. allows investment companies to operate outside of SEC regulations.
5. The real estate valuation method which assigns quantitative rankings to a property's characteristics for use in a regression model is the:

A. cost approach.
B. income approach.
C. sales comparison approach.
D. hedonic price estimation approach.
6. What is the NOI for an office building, calculated with the following information:
 - Gross rental income \$250,000
 - Estimated vacancy and losses 7%
 - Taxes & insurance \$18,000
 - Utilities & maintenance \$21,000
 - Depreciation \$20,000

A. \$173,500.
B. \$191,000.
C. \$193,500.
D. \$211,000.

7. An investor is considering investing \$2,000,000 in a venture capital project that promises to pay \$12,000,000 at the end of four years. The investor realizes there is some risk that the project will fail prior to the end of four years, in which case the investor will lose the entire investment. Using the following information, determine the probability that the project survives until the end of the fourth year.
- | | | | | |
|---------------------|------|------|------|------|
| Year | 1 | 2 | 3 | 4 |
| Failure probability | 0.22 | 0.20 | 0.18 | 0.15 |
- A. 18.8%.
B. 43.5%.
C. 56.5%.
D. 81.3%.
8. A portfolio manager has been researching a potential venture capital investment. The venture, ABC, Inc. has recently received patent approval for a new widget but has yet to begin production and marketing of the new product. Which of the following *best* describes this stage of venture capital investing?
A. First stage.
B. Seed stage.
C. Third stage.
D. Second stage.
9. The one characteristic that hedge funds as an asset class have in common is that they typically:
A. are highly leveraged.
B. seek absolute returns.
C. utilize some type of hedging strategy.
D. focus on making macroeconomic bets.
10. The biggest advantage for a U.S. hedge fund to be structured as a limited partnership organized under Section 3(c)(1) of the Investment Company Act is:
A. to gain exemption from most SEC regulations.
B. to lower the minimum initial required investment.
C. to be able to freely advertise to prospective investors.
D. the elimination of restrictions on the number of allowable investors.
11. An investor makes a \$1 million investment in a venture capital project that has an expected payoff of \$5,000,000 at the end of four years. The cost of capital is 10%. If the conditional annual failure probabilities over the first four years are 10%, 15%, 20%, and 15%, what is the expected NPV of the project?
A. \$2,415,067.
B. \$366,067.
C. \$775,834.
D. \$698,057.
12. A hedge fund that seeks to invest in the equity and debt of companies emerging from bankruptcy reorganization can *best* be described as a(n):
A. event-driven fund.
B. global macro fund.
C. risk arbitrage fund.
D. emerging-market fund.

13. A fund of funds (FOF) can provide its investors with all of the following advantages EXCEPT:
 - A. performance of due diligence.
 - B. diversification across several markets.
 - C. lower fees through economies of scale.
 - D. expertise in the selection of hedge funds.
14. Recent studies of the risk and returns of hedge funds over the past decade present many compelling reasons for investors to be involved in hedge funds. The main benefits of hedge fund investing include all of the following EXCEPT:
 - A. hedge funds tend to have lower risk than equity investments.
 - B. the correlation of hedge fund returns with those of traditional investments is generally high.
 - C. hedge fund strategies have higher Sharpe ratios than traditional equity investments.
 - D. hedge funds have experienced higher net returns than the broad equity and fixed-income markets.
15. Historical data regarding hedge fund returns has limitations because hedge fund managers tend to submit data on only those hedge funds with impressive track records, while omitting data on those that have closed. This bias in performance data can *best* be described as:
 - A. gaming.
 - B. survivorship bias.
 - C. instant history bias.
 - D. smoothed presentation.
16. Investments in closely held companies require extensive analysis, beyond what is required by traditional investments. This is due to questions regarding:
 - A. valuation.
 - B. legal structure.
 - C. management accountability.
 - D. disclosure of financial information.
17. A portfolio manager is considering taking a 5% position in a closely held company. Currently, the company's founder/CEO holds over 60% of the company's equity. The portfolio manager is valuing his potential investment based upon the market value of a comparable company whose stock is actively traded. In this case, the value of the comparable company will be adjusted by a:
 - A. control discount.
 - B. control premium.
 - C. minority discount.
 - D. minority premium.
18. The main motivation for a passive investor to participate in the commodities market is that it provides:
 - A. a store of value.
 - B. for speculative profits.
 - C. a hedge against inflation risk.
 - D. participation in the real economy.
19. A major benefit of investing in commodity-linked securities rather than holding commodities is that:
 - A. commodity-linked securities may provide current income.
 - B. counter-party risk is lower with commodity-linked securities.
 - C. there is higher liquidity in the commodity-linked securities market.
 - D. commodity-linked securities can provide higher speculative profits.

COMPREHENSIVE PROBLEMS: ALTERNATIVE INVESTMENTS

1. Assume an expected annual gross return of 8% and the various fee and expense structures in the Table below.

	<i>Class A Shares</i>	<i>Class B Shares</i>	<i>Class C Shares</i>
Front-end load (charged at time of sale)	4% of Investment	none	none
Back-end load (redemption fees)	none	Initially 5% of sale proceeds—declines by 1% each year	2% during the first year
Annual Fees (calculated on year-end values)			
Distribution fees	none	0.5%	1.0%
Fund management fees	0.8%	0.8%	0.8%
Other fund expenses	0.2%	0.2%	0.2%
Total annual fees	1.0%	1.5%	2.0%

- A. What are the holding period returns for each class of fund shares over a 4-year period?
- B. Which class of shares would produce the highest average annual compound rate of return for an investor over a 4-year period?
- C. Which class of shares would be the best choice for a short holding period of one or two years? Answer without calculations and explain your reasoning.
2. A regression of a sample of house prices (U.S. dollars) on three important characteristics yielded the following results.

Intercept	134,534
Slope coefficients:	
Square feet	7.54
Number of bathrooms	14,345
Miles from subway station	-13,980

An appraiser is using this model to value a house with two bathrooms and 1,300 square feet of living space that is 4.3 miles from the closest subway station. What will the estimated value be?

3. A real estate investor is considering the purchase of a building for \$7 million, putting 30% down and financing the rest of the purchase price with a 30-year mortgage loan (fully amortizing with 30 equal annual payments) at an interest rate of 9%. The net operating income on the building is estimated to be \$675,000 the first year and to grow at the expected inflation rate of 3%. At the end of the third year, the investor expects to sell the building for \$7.4 million. The investor is in the 28% marginal tax bracket and interest is tax deductible. He will use straight-line depreciation for the building only (not the land) which is \$200,000 per year. Assume for this problem that the tax rate on any gain on the sale of the property is 15%.
- A. What are the after-tax cash flows the investor expects in years 1, 2, and 3?
- B. What are the net (after-tax) proceeds of the sale at the end of year 3?
- C. If the investor requires an after-tax rate of return of 15% on such investments, should he purchase the building?

4. The trustee of a retirement fund has been told by a consultant that for diversification purposes his fund should invest approximately 35% of assets in real estate in the major cities of the North Atlantic region in the U.S. When asked about the source of his data on real estate returns, the consultant informs the trustee that returns based on the NCREIF index for the North Atlantic region were used. What would your advice to the trustee be?
5. Consider the following four hedge fund fee structures.
 - I. 1% per year plus 20% of gross returns in excess of the risk-free rate.
 - II. 20% of gross returns in excess of the absolute value of any negative returns from the previous year.
 - III. 1% per year plus 20% of any returns in excess of the total returns on the S&P 500 index.
 - IV. 1% per year plus 20% of any returns for the fund above its previous highest value (high watermark provision).

Assume that for the current year the risk-free return was 4.5%, the S&P 500 Index had a total return of 9.5%, and the gross return on the fund was 17%. Further, assume that the fund gross returns last year were +2% and that it has never had negative gross returns in any year.

- A. Calculate the returns (net of fees) that an investor would earn under each of the above fee structures.
 - B. If all remains the same, except that the previous year's gross return had been -10%, calculate the returns an investor would earn under each of the above fee structures.
 - C. If all remains the same (as in-part A), but the current year's return is -13% and the current year's total return on the S&P 500 Index is -20%, which fund structure will give an investor the lowest return net of fees?
6. A trustee for a large tax-deferred institutional portfolio has hired a consultant to advise her on the possible advantages of investing a portion of the portfolio's assets in hedge funds as an asset class to potentially increase returns, decrease portfolio risk, or both. Based on a database of 5-year performance for all the currently investable hedge funds that have both been in existence and reported returns for the entire 5-year period, the consultant states: "The average annual fund gross return has been 17.8% with a standard deviation of returns of 15%. The standard deviation of returns on the S&P 500 Index over the same period was 10%. The Sharpe ratio for the hedge funds as an asset class has been 0.80 while the Sharpe ratio for an investment in the S&P 500 Index has been 0.70 for the same 5-year period. Based on the correlation of hedge-fund returns with the returns on the assets currently in the institutional portfolio and the average returns on the hedge funds, I recommend a 30% allocation of existing portfolio assets to hedge funds."
 - A. What was the average risk-free rate over the period?
 - B. What was the average annual return for the S&P 500 Index over the 5-year period?
 - C. How would you respond to the consultant's recommendation of a 30% allocation to hedge funds? Refer to as many characteristics of the hedge fund data used as you can.
7. Gold has a negative beta.
 - A. Based on the CAPM, how will the expected return on an investment in gold compare to the risk-free rate?
 - B. How can you use what you know about modern portfolio theory to explain why investors would choose to hold gold, based on your answer to A above.

ANSWERS – CONCEPT CHECKERS: ALTERNATIVE INVESTMENTS

1. A The net asset value is the investment company's assets minus its liabilities, stated on a per-share basis.

$$\text{NAV} = \frac{\$250,000,000 - \$25,000,000}{10,500,000 \text{ shares}} = \$21.43 \text{ per share}$$

2. D The market price of \$22.50 is at a premium to NAV at \$21.25. The fund is not an open-end fund because shares of an open-end fund always trade at NAV. The fund does not charge a load because it is a closed-end fund.
3. A A style strategy concentrates on equities that share similar underlying characteristics. Sector strategies focus on a specific industry. Global strategies invest in securities from around the world. A stable-value fund is involved in securities that pay principal and a fixed interest payment.
4. C The in-kind process allows for the creation and redemption of shares through market makers, which operate outside the legal structure of the fund. In a traditional open-end fund, when shares are redeemed, the manager must sell fund assets to pay off the redemption, thus possibly creating capital gains issues for the remaining fund shareholders.
5. D Hedonic price estimation is a variation of the sales comparison approach that uses recent transactions as a benchmark to estimate market value. The cost approach only considers what it would cost today to rebuild improvements on a property. The income approach values a property based on an estimate of future income.
6. C NOI is gross income less vacancy and collection costs, taxes and insurance, and utilities and maintenance. Depreciation is not a factor because it is assumed that proper maintenance will keep the property in its current condition. The calculation is $\$250,000 - (\$250,000 \times 7\%) - \$18,000 - \$21,000 = \$193,500$.
7. B The probability that the venture will survive to the end of the fourth year is calculated as follows:
 $(1 - 0.22)(1 - 0.20)(1 - 0.18)(1 - 0.15) = 0.435$, or 43.5%
8. A First-stage financing refers to capital provided to begin manufacturing and sales. Seed-stage is prior to first-stage financing and involves providing capital for developing a business idea. Second-stage financing is used for expansion of a company already producing and selling a product. Third-stage financing provides for a major expansion of an existing corporation.
9. B Hedge funds as an asset class follow a vast array of strategies as far as leverage, market bets, and hedging strategies. The only common characteristic is their search for absolute returns.
10. A Forming as a limited partnership frees the hedge fund from most SEC regulations. The structure does, however, place strict limitations on the number of "qualified" investors, which in turn effectively raises the minimum initial investment. Also, under this structure, advertising is prohibited.
11. C The NPV if successful (survives four years) is $\frac{5 \text{ million}}{(1.10)^4} - 1 \text{ million} = \$2,415,067$. The probability of surviving four years is $(0.9)(0.85)(0.8)(0.85) = 0.52$. The NPV if unsuccessful is -1 million , so the expected NPV is $0.48(-1 \text{ million}) + 0.52(2,415,067) = \$775,834$.
12. A An event-driven fund makes bets on some event specific to a company or security, such as the successful emergence from bankruptcy. A global macro fund bets on the direction of some macroeconomic variable, such as interest rates or currencies. A risk arbitrage fund focuses on arbitrage opportunities arising from mergers and acquisitions. An emerging market fund is involved in securities in lesser-developed emerging markets.
13. C The FOF manager will charge a management fee in addition to those fees charged by the underlying hedge funds.

14. B The correlation of hedge fund returns to those of conventional investments is actually low. Low correlation is preferable because it provides diversification benefits in a portfolio.
15. B Survivorship bias occurs because unsuccessful managers and their funds tend to fade away over time, leaving only successful managers with impressive track records in the performance database. Gaming refers to managers either taking big risks to make up for past poor performance or refraining from taking more risk to avoid damage to a good track record. Instant history bias happens when successful managers enter a database, causing performance history for the industry as a whole to reflect better returns than were truly realized because unsuccessful managers do not tend to submit performance information.
16. A Questions regarding valuation arise from differences in legal structures among closely held companies, each of which have unique ownership differences and tax implications for the investor. Disclosure of financial information and management accountability are not typical causes for additional analysis.
17. C From the portfolio manager's viewpoint, the value of the position should be discounted by some amount because he will own a minority share and will not be in a position to influence operations of the company.
18. C A passive investor is seeking diversification benefits because commodities tend to have a positive correlation with inflation. An active investor is seeking speculative profits in periods of economic growth. Some investors may regard gold as a good store of value, but not all commodities hold their value over time. Participation in the real economy is an unlikely motivation for investing in commodities.
19. A Commodity-linked securities can provide current income, while pure commodities afford returns through price increases. There is no evidence that the commodity-linked securities market is more liquid, provides less counterparty risk, or allows higher speculative profits than commodities.

ANSWERS – COMPREHENSIVE PROBLEMS: ALTERNATIVE INVESTMENTS

1. A. Assuming a 4-year holding period, the holding period returns for:
Class A shares would be: $(1 - 0.04)(1.08)^4(1 - 0.01)^4 - 1 = 25.46\%$.
Class B shares would be: $(1.08)^4(1 - 0.015)^4(1 - 0.01) - 1 = 26.79\%$. (Back-end load is 1% after 4 years)
Class C shares would be: $(1.08)^4(1 - 0.02)^4 - 1 = 25.49\%$.
B. Class B shares would provide the greatest holding period return and therefore the greatest average annual compound rate of return.
C. Over short holding periods such as one or two years, Class C would be the best choice. Although Class C shares have higher annual expenses, the relatively high front-end charges for Class A shares and redemption charges for Class B shares in the early years will outweigh the savings from lower total annual fees.
2. $134,534 + 7.54(1,300) + 14,345(2) - 13,980(4.3) = \$112,912$
3. A. The amount borrowed is \$4.9 million (0.7×7 million). At 9% and with 30 level payments, the payments will be \$476,948.

Year 1 (rounding to whole dollars):
Interest will be $0.09 \times 4.9 \text{ million} = \$441,000$
Principal repayment will be $476,948 - 441,000 = \$35,948$

After-tax cash flow for year 1 will be:
 $[\text{NOI} - \text{interest} - \text{depreciation}](1 - \text{tax rate}) - \text{principal repayment} + \text{depreciation}$
 $[675,000 - 441,000 - 200,000](1 - 0.28) - 35,948 + 200,000 = \$188,532$

At the end of year 1 the remaining principal on the mortgage loan is $4,900,000 - 35,948 = \$4,864,052$
Year 2 interest will be $4,864,052 \times 0.09 = \$437,765$
Year 2 principal payment will be $476,948 - 437,765 = \$39,183$

After-tax cash flow for year 2 will be:

$$[\text{NOI} - \text{interest} - \text{depreciation}](1 - \text{tax rate}) - \text{principal repayment} + \text{depreciation}$$

$$[675,000(1.03) - 437,765 - 200,000](1 - 0.28) - 39,183 + 200,000 = \$202,206$$

At the end of year 2 the remaining principal on the mortgage loan is $4,864,052 - 39,183 = \$4,824,869$

Year 3 interest will be $4,824,869 \times 0.09 = \$434,238$

Year 3 principal payment will be $476,948 - 434,238 = \$42,710$

After-tax cash flow for year 3 will be:

$$[\text{NOI} - \text{interest} - \text{depreciation}](1 - \text{tax rate}) - \text{principal repayment} + \text{depreciation}$$

$$[675,000(1.03)^2 - 434,238 - 200,000](1 - 0.28) - 42,710 + 200,000 = \$216,236$$

- B. At the time of sale, the remaining mortgage balance is $4,824,869 - 42,710 = 4,782,159$

The depreciated book value is: $7,000,000 - (3 \times 200,000) = 6,400,000$

Cash from sale is: $7,400,000 - 4,782,159 = \$2,617,841$

Capital gains tax is: $7.4 \text{ million} - 6.4 \text{ million} = 1 \text{ million}$ $(0.15) = 150,000$

After-tax proceeds from sale are: $2,617,841 - 150,000 = \$2,467,841$

Total after-tax cash flow at the end of year 3 is: $2,467,841 + 216,236 = \$2,684,077$

- C. With a down payment of \$2.1 million, and the three cash flows calculated above (in bold), we can calculate the IRR on the investment, which is 14.64%. Since this is an after-tax return, we can compare it to the required rate of 15% and conclude that the investment will have a negative NPV and should not be undertaken.

4. The NCREIF index is based on appraised values and likely underestimates the true volatility of prices and the correlation of real estate returns with U.S. stock market returns. Both sources of bias will lead to overestimates of the optimal allocation to real estate in efficient portfolios based on portfolio optimization models.

5. A. I. $17 - 1 - 0.2(17 - 4.5) = 13.5\%$
 II. $17 - 0.2(17) = 13.6\%$
 III. $17 - 1 - 0.2(17 - 9.5) = 14.5\%$
 IV. The fund has never had negative gross returns so its beginning value this year was its previous highest value.
 $17 - 1 - 0.2(17) = 12.6\%$

- B. I. Same as part A, 13.5%
 II. $17 - 0.2(17 - 10) = 15.6\%$
 III. Same as part A, 14.5%
 IV. As an example, assume the fund's value was \$1,000 at the beginning of last year and it fell 10% to 900. The 17% gross return this year brings the fund's ending value to $900(1.17) = \$1,053$. The returns on the fund above its highest value (\$1,000) are therefore 5.3%. Investor returns net of fees are: $17 - 0.2(5.3) - 1 = 14.94\%$.

If your approach to this part of the problem gave you a slightly different answer, don't be disheartened. The important part here is to understand the implications of a high watermark provision compared to an incentive structure without such a provision.

- C. Because the fund's returns were less than the risk-free rate, under structure (I) there would be no incentive fee, only the fixed 1% fee. Since the fund did not have a positive return, structure (II) would result in no fee and structure (IV) would result in only the 1% fee. Since the fund did outperform the S&P 500 index, structure (III) would result in an incentive fee of 20% of the fund return in excess of the index return, $0.2[-13 - (-20)] = 1.4\%$. Therefore, structure (III) would result in the lowest return net of fees: $-13 - 1 - 1.4 = -15.4\%$.

6. A. Sharpe ratio = $\frac{R_p - R_f}{\sigma_p}$. Therefore, $R_f = R_p - \text{Sharpe ratio} \times \sigma_p$.

Using the hedge fund asset class data: $R_f = 17.8 - 0.8(15.0) = 5.8\%$.

B. $R_p = R_f + \text{Sharpe ratio} \times \sigma_{\text{index}}$

Using the S&P 500 Index data: $R_{\text{index}} = 5.8 + 0.7(10.0) = 12.8\%$

- C. By including only funds that have been in existence for five years and reported results for the entire period, the consultant's data are subject to significant biases. The data do not include funds whose managers choose not to report results, which are likely to be the poorer performers. Likewise, the managers who do report results can engage in "cherry picking," reporting results only for their more successful funds. These characteristics will lead to an overestimate of average fund returns.

The data would be influenced by survivorship bias as they do not include funds that ceased to exist during the 5-year period. Funds that ceased to exist would tend to be those with poor returns (biasing average fund returns upwards) and those that took on more risk (biasing fund standard deviation downward). All of these biases would pull the average return for funds in the database above the true average return for hedge funds as an asset class.

Hedge funds often deal in infrequently traded assets for which market values must be estimated using a pricing model. This tends to smooth the assets' reported values and make the funds' volatility appear lower than it really is. At the same time, such model pricing will likely lead to a downward bias in the correlation of fund returns with the returns of other asset classes.

Also, for funds that use strategies with asymmetrical returns (i.e., limited upside potential but unlimited downside potential), standard deviation may not adequately capture the true risk taken.

The 30% recommended allocation is very likely too high for all of these reasons. The artificially high expected returns and artificially low standard deviation and correlation will all tend to increase the estimate of the allocation to hedge funds in an optimal portfolio.

7. A. The CAPM relation is $E(R_i) = RFR + \beta_i [E(R_{\text{mkt}}) - RFR]$. A negative beta means the expected return on gold is less than the risk free rate (assuming a positive market risk premium).
- B. The question here is why investors would choose to hold a risky asset that has an expected return less than the risk-free rate. The negative systematic risk (beta) of gold gives it attractive hedging properties. When market returns are negative, returns on gold will be less so or even positive. The benefits in terms of risk reduction more than compensate for the decrease in portfolio expected returns from including gold in the portfolio.

FORMULAS

full price = clean price + accrued interest

$$\text{duration} = -\frac{\text{percentage change in bond price}}{\text{yield change in percent}}$$

value of a callable bond = value of an option-free bond – value of the call

$$\text{TIPS coupon payment} = \text{inflation-adjusted par value} \times \frac{\text{stated coupon rate}}{2}$$

absolute yield spread = yield on the higher-yield bond – yield on the lower-yield bond

$$\text{relative yield spread} = \frac{\text{absolute yield spread}}{\text{yield on the lower-yield bond}} = \frac{\text{higher yield}}{\text{lower yield}} - 1$$

$$\text{yield ratio} = \frac{\text{higher yield}}{\text{lower yield}}$$

after-tax yield = taxable yield \times (1 – marginal tax rate)

$$\text{taxable-equivalent yield} = \frac{\text{tax-free yield}}{(1 - \text{marginal tax rate})}$$

$$\text{bond equivalent yield} = \left[(1 + \text{monthly CFY})^6 - 1 \right] \times 2$$

spot rate from forward rates:

$$S_3 = \left[(1 + {}_1f_0)(1 + {}_1f_1)(1 + {}_1f_2) \right]^{\frac{1}{3}} - 1$$

forward rate from spot rates:

$${}_1f_2 = \frac{(1 + S_3)^3}{(1 + S_2)^2} - 1$$

$$\text{effective duration} = \frac{(\text{bond price when yields fall} - \text{bond price when yields rise})}{2 \times (\text{initial price}) \times (\text{change in yield in decimal form})} = \frac{V_- - V_+}{2V_0(\Delta y)}$$

percentage change in bond price = –effective duration \times change in yield in percent