Chapter 1 - Investments: Background and Issues

- Investment vs. investments
- Real assets vs. financial assets
- Financial markets and the economy
- Investment process
- Competitive markets
- Players in investment markets
- Recent trends
- Investments as a profession

- Investment vs. investments
  Investment: the commitment of current resources in the expectation of deriving greater resources in the future

  For example:
  You cut current consumption to purchase stocks and anticipate that stock prices will rise in the future
  You forgo current leisure and income to take the investments class and expect that a degree from CSUN will enhance your future career

  Investments
  The detailed study of the investment process - focus of this class

- Real assets vs. financial assets
  Real assets: assets used to produce goods and services
  Financial assets: claims on real assets or income generated by real assets

  Financial assets
  Fixed-income securities: paying a fixed stream of income over a specified period - CDs, bonds, T-bills, etc
  Equity: ownership in a corporation - stocks
  Derivative securities: their payoffs depend on the values of other assets - futures, options, swaps, etc (FIN 436 - Futures and Options for more details)

  Balance sheet for U.S. households, 2008 (Table 1.1 - Digital Image)
  
<table>
<thead>
<tr>
<th></th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real assets</td>
<td>$26,395 billion (37.5%)</td>
<td>Liabilities: $14,496 billion (20.6%)</td>
</tr>
<tr>
<td>Financial assets</td>
<td>$44,071 billion (62.5%)</td>
<td>Net worth: $55,970 billion (79.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>$70,466 billion (100%)</td>
<td>Total</td>
</tr>
</tbody>
</table>
• Financial markets and the economy
  Informational role of financial markets
  Consumption timing
  Allocation of risk
  Separation of ownership and management: agency problem
  Corporate governance: accounting scandal, analyst scandal, IPO share allocation

• Investment process
  (1) Investment policy: objective, risk-return trade-off
  (2) Asset allocation: choice of broad asset classes
  (3) Security selection: choice of particular securities to be held in the portfolio
  (4) Security analysis: valuation of securities
  (5) Portfolio construction and analysis: selection of the best portfolio
  (6) Portfolio rebalancing: adjustment of the portfolio

• Competitive markets
  Risk-return trade off: no free lunch rule indicates that assets with higher expected returns entail greater risk

  Efficient markets: security prices should reflect all the information available in the market quickly and efficiently

• Players in investment markets
  Government: federal, state, and local

  Business: firms and corporations, including financial intermediaries

  Individuals: individual investors, institutional investors

  Financial intermediaries: institutions that connect borrowers and lenders such as banks, investment companies, insurance companies, and credit unions, etc

  Investment bankers: specializing in the sale of new securities to the public in the primary market

  Primary markets vs. secondary markets

  Primary markets are markets for new issues of securities

  Secondary markets are markets for trading previously issued securities
• Recent trends
  Globalization: integration of global financial markets
  Securitization: pooling loans into standardized securities
  Financial engineering: creation of new securities by combining primitive and
  derivative securities into one composite hybrid (for example, combining stocks
  and options) or by separating returns on an asset into classes (for example,
  separating principal from interest payment in a fixed income security)
  Computer network

• Investments as a profession
  Investment bankers
  Traders and brokers
  Security analysts and/or CFA (Chartered Financial Analyst)
  Portfolio managers
  Financial planners
  Financial managers

• ASSIGNMENTS
  1. Concept Checks and Summary
  2. Key Terms
  2. Intermediate: 9 and 10
Chapter 2 - Asset Classes and Financial Instruments

- Money markets
- Bond markets
- Equity markets
- Market indexes
- Derivative markets

- Money markets
  Money markets vs. capital markets
  Money markets: short-term, highly liquid, and less-risky debt instruments
  Capital markets: long-term debt and stocks

Securities in money markets:
T-bills: short-term government securities issued at a discount from face value and returning the face amount at maturity

T-bills are issued weekly with initial maturities of 4 weeks, 13 weeks, 26 weeks, and 52 weeks. The minimum denomination is $100, even though $10,000 denominations are more common. It is only subject to federal taxes and is tax exempt from state and local taxes.

Bid vs. asked price
Bid price is the price you will receive if you sell a T-bill to a dealer
Asked price is the price you pay to buy a T-bill from a dealer
Asked price > bid price, the difference is called bid-ask spread - profit for a dealer

T-bills are quoted in yields based on prices (Figure 2.2 - Digital Image)

For example, a 161 day T-bill sells to yield 1.19% means that a dealer is willing to sell the T-bill at a discount of 1.19%*(161/360) = 0.532% from its face value of $10,000, or at $9,946.80 [10,000*(1 – 0.00532) = 9,946.80]. If an investor buys this T-bill, the return over 161 days will be ($10,000/$9,946.80) - 1 = 0.535%. The annualized return will be 0.535%*(365/161) = 1.213%.

Similarly, a dealer is willing to buy the 161 day T-bill at a discount of 1.20% or at $9,946.33 for a face value of $10,000.
[10,000*(1 – 0.0120*(161/360)) = $9,946.33]

CDs: a bank time deposit

Commercial paper: a short-term unsecured debt issued by large corporations
Banker’s acceptance: an order to a bank by a customer to pay a sum of money in a future date

Repurchase agreements (Repos): short-term sales of government securities with an agreement to buy them back later at a higher price

Other short-term debts

- Bond markets
  - T-notes and T-bonds: debt issued by the federal government with original maturity of more than one year. The minimum denomination is $1,000.

  T-notes: up to 10 years in maturity and pay semiannual interests

  T-bonds: up to 30 years in maturity and pay semiannual interests

Coupon rate and coupon payments

Prices are quoted as a percentage of $100 face value (in units of 1/32 of a point) (Figure 2.4 - Digital Image)

For example, a quoted price of 96:10 means a price of $96\frac{10}{32}$ (or $96.3125$) for a face value of $100$, or $963.125$ for a $1,000$ face value bond.

Inflation-protected T-bonds (TIPS): the principal amount is adjusted in proportion to increases in the Consumer Price Index to earn a constant stream of income in real dollars

Municipal bonds: tax-exempt bonds issued by state and local governments

Equivalent taxable yield: \( r = r_m/(1 - t) \)

After tax return: \( r_m = r^*(1 - t) \)

Example: suppose your marginal tax rate is 28%. Would you prefer to earn a 6% taxable return or 4% tax-free yield? What is the equivalent taxable yield of the 4% tax-free yield?

Answer: \( 6% \ast (1-28%) = 4.32\% \) or \( 4%/(1-28%) = 5.56\% \)

You should prefer 6% taxable return because you get a higher return after tax, ignoring the risk
Federal agency debt: issued by government agencies, such as Freddie Mac, Fannie Mac, and Ginnie Mac

Corporate bonds: issued by corporations (rated from AAA, AA, A, BBB, BB, …)

Mortgages and mortgage-backed securities
Mortgage lenders originate different loans, including fixed or variable loans and then bundle them in packages and sell them in the secondary market.

International bonds

- Equity markets
  Common stock: ownership of a corporation
  Characteristics: residual claim and limited liability

Stock market listing for General Electric (Figure 2.8 - Digital Image)
Stock Symbol (GE)
Close (Closing price is $25.25)
Net Change (-$0.43, the change from the closing price on the previous day)
Volume (trading volume is 44,302,631 shares)
52 week high and low (range of price, for GE, $42.15 - $22.16)
Dividend ($1.24 is the annual dividend, or $0.31 last quarter)
Dividend yield (1.24/25.25 = 4.9%)
P/E (price to earnings ratio is 12)

Preferred stock: hybrid security with both bond and common stock features

Cumulative and non-cumulative preferred stocks

Tax treatment for firms: 70% of preferred stock dividends received by a firm is tax-exempt (70% exclusion)

70% exclusion doesn’t apply to individuals

- Market indexes
  Averages vs. indexes

Averages: reflect general price behavior in the market using the arithmetic average, price weighted
Indexes: reflect general price behavior in the market relative to a base value, market value weighted
Dow Jones Industrial Average (DJIA): a stock market average made up of 30 high-quality industrial stocks and believed to reflect the overall stock market

Current Dow Companies (Table 2.6 - Digital Image)

\[
\text{DJIA} = \frac{\sum \text{Closing P1} + \sum \text{Closing P2} + \ldots + \sum \text{Closing P30}}{\text{DJIA divisor}}
\]

S&P 500 index: a market value-weighted index made up of 500 big company stocks and believed to reflect the overall market

\[
\text{S&P indexes} = \frac{\sum \text{Current closing market value of stocks}}{\sum \text{Based period closing market value of stocks}}
\]

Market value (market cap) = market price * number of shares outstanding

Note: stocks in DJIA and S&P indexes can change

Other averages and indexes

Dow Jones transportation average (20 transportation stocks, price weighted)
Dow Jones utility average (15 utility stocks, price weighted)
Dow Jones composite average (65 stocks, including 30 industrial, 20 transportation, and 15 utility stocks, price weighted)

NYSE composite index: behavior of stocks listed on the NYSE

Nasdaq 100 index: OTC market stock behavior

Russell 2000 index: small stock behavior

Wilshire 5000 index (NYSE and OTC): overall stock market behavior

Market indexes, example 1
You are given the following information regarding stocks X, Y, and Z:

<table>
<thead>
<tr>
<th>Date</th>
<th>Stock price</th>
<th># of shares outstanding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X* Y Z</td>
<td>X* Y Z</td>
</tr>
<tr>
<td>0</td>
<td>$50 $50 $50</td>
<td>100 100 100</td>
</tr>
<tr>
<td>1</td>
<td>26 51 51</td>
<td>200 100 100</td>
</tr>
<tr>
<td>2</td>
<td>27 52 52</td>
<td>200 100 100</td>
</tr>
</tbody>
</table>
* Stock X has a 2-for-1 stock split before trading on day 1. Date 0 is the base date. The current divisor is 3.0 and the base value for an S&P type of index is supposed to be 10.

Q1. What would be the value of an S&P type index at the end of date 1?

\[
\frac{26*200 + 51*100 + 51*100}{50*100 + 50*100 + 50*100} \times 10 = 10.27
\]

Rate of return on date 1 = \( \frac{10.27}{10} - 1 = 2.7\% \)

Q2. What would be the value of an S&P type index at the end of date 2?

\[
\frac{27*200 + 52*100 + 52*100}{50*100 + 50*100 + 50*100} \times 10 = 10.53
\]

Rate of return on two days = \( \frac{10.53}{10} - 1 = 5.3\% \)

Q3. What would be the value of a DJIA type average at the end of date 2?

At the end of date 0: DJIA type average = \( \frac{50 + 50 + 50}{3} = 50 \)

Before date 1: DJIA type average = \( \frac{25 + 50 + 50}{d} = 50 \), solve for \( d = 2.5 \)

(Rational: A 2-for-1 stock split for stock X will split the price in half but it should not affect the average itself. Therefore, the divisor should be adjusted.)

At the end of date 2: DJIA type average = \( \frac{27 + 52 + 52}{2.5} = 52.4 \)

Rate of return on two days = \( \frac{52.4}{50} - 1 = 4.8\% \)

Market indexes, example 2
Consider a price weighted market average composed of three securities, A, B, and C, with prices of 20, 30 and 40 respectively. The current divisor is 3.00. What will be the new divisor if stock B issues a 10% stock dividend?

Answer: closing average before stock dividend = \( \frac{20 + 30 + 40}{3.00} = 30.00 \)

Adjust the price of stock B: \( \frac{30}{1 + 0.1} = 27.27 \) (new stock price for B if B issues 10% stock dividend)

Calculate the new divisor: \( \frac{20 + 27.27 + 40}{d} = 30.00 \) (stock dividend should not affect the closing average) and solve for the new divisor, \( d = 2.91 \)
- Derivative markets
  - Derivative assets or contingent claims: payoffs depend on the prices of other (underlying) assets

  Options: the rights to buy or sell an asset at a specified price on or before a specified expiration date (rights)

  A call option gives the right to buy an asset
  A put option gives the right to sell an asset

  Example 1 - you buy a March 140 IBM call option at $5.00
  Call option: right to buy
  Stock option: underlying asset is IBM stock
  Contract size: 100 shares
  Exercises price: $140 to buy one share of IBM stock
  Expiration date: the third Friday in March
  Option premium: $500
  Rationale: you expect IBM stock price is going to rise

  Example 2 - you buy a March 25 Intel put option for $2.00
  Put option: right to sell
  Stock option: underlying asset is Intel stock
  Contract size: 100 shares
  Exercises price: $25 to sell one share of Intel stock
  Expiration date: the third Friday in March
  Option premium: $200
  Rationale: you expect that Intel stock price is going to fall

  Futures contracts: call for the exchange of certain goods for cash at an arranged-upon price (future’s price) at a specified future date (obligations)

  Example 3 - you buy a June gold futures contract at $1,300 per ounce
  Commodity futures contract: underlying asset is a commodity
  Contract size: 100 ounces
  Futures price: $1,300 per ounce to buy gold
  Delivery month: June
  Rationale: you expect gold price is going to rise

  Example 4 - a farmer sells an October corn futures contract at 475
  Commodity futures contract: underlying asset is a commodity
  Contract size: 5,000 bushels
  Futures price: $4.75 per bushel to sell corn
  Delivery month: October
  Rationale: the farmer wants to lock in the price, hedging
• ASSIGNMENTS

1. Concept Checks and Summary
2. Key Terms
3. Intermediate: 12, 13, 14, 18, 19, and CFA1
Chapter 3 - Securities Markets

- New issues
- How securities are traded
- U.S. securities markets
- Trading costs
- Margin trading and short sales

- New issues
  Recall primary markets and secondary markets

  Primary markets: for new issues, either IPOs or existing firms issuing new securities (seasoned offerings)

  IPOs: initial public offerings, shares being sold to the public for the first time

  Investment banker: firm specializing in the sale of new securities

  Underwriting: the process of purchase new shares from the issuing firm and resell the shares to the public

  Prospectus: a document that describes the firm issuing the security and provides the information about the firm

  Selling process for large new issues: the role of investment bankers
  Underwriting; Advising; Distributing

  Best efforts vs. underwritten issues

  Underwriting syndicate: a group of investment bankers formed by a leading underwriter to spread the financial risk associated with selling new securities
Private placement: new securities are sold directly to a small group of individuals or wealthy investors

Initial return of IPOs: very high first day returns all over the world (Figure 3.2 - Digital Image)

IPOs in the long run: in general poor performance, especially in next three years (Figure 3.3 - Digital Image)

- How securities are traded
  Types of markets

  Direct search markets: buyers and sellers seek each other directly, which are the least organized markets, for example, a student buys a used car from another student

  Brokered markets: brokers offer search services for profits/commissions, for example, the real estate market

  Dealer markets: dealers specializing in particular assets buy and sell them in their own accounts for profits, for example, the over-the-counter (OTC) markets

  Auction markets: traders converge at one place to buy and sell assets, for example, the New York Stock Exchange (NYSE). Auction markets are the most efficient markets because all traders will get the best price possible.

Types of brokers
  Full service broker vs. discount broker

Types of accounts
  Cash account vs. margin account (without or with borrowing capacity)

Bid price - the highest price a dealer is willing to pay for a given security
Asked price - the lowest price a dealer is willing to sell a given security
Bid-ask spread: the difference of the two prices, which is the profit for a dealer

Types of orders:
  Market order: to buy or sell at the best price available

  Limit order: to buy at or below a specified price or sell at or above a specified price

  Stop order (stop-loss order): to sell when price reaches or drops below a specified level or to buy when price reaches or rises above a specified level. It becomes a market order when the stop price is reached.
Stop-limit order: a combination of stop and limit orders

Comparison of a limit order and a stop order (Figure 3.5 - Digital Image)

<table>
<thead>
<tr>
<th></th>
<th>Price falls below the limit</th>
<th>Price rises above the limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy</td>
<td>Limit-buy order</td>
<td>Stop-buy order</td>
</tr>
<tr>
<td>Sell</td>
<td>Stop-loss order</td>
<td>Limit-sell order</td>
</tr>
</tbody>
</table>

Trading mechanics
Dealer markets: trade through dealers, for example, in OTC markets
Electronic communication networks (ECNs): direct trade over computer network without market makers or dealers
Specialist markets: trade through specialists, for example, in NYSE

Specialist: a trader who makes a market in the shares of one or more stocks and maintains a fair and orderly market by dealing personally in the market

- U.S. securities markets
  Nasdaq: National Association Security Dealers Automated Quotations System
  Nasdaq stock market: a computer-linked price quotation system for the OTC markets with about 3,200 firms listed for trading

  NYSE: New York Stock Exchange, the largest exchange in the U.S. with about 2,800 firms listed for trading

  Block trade: a large transaction in which at least 10,000 shares of stock are bought or sold

  Program trade: a coordinated purchase or sale of an entire portfolio

  Settlement: a trade must be settled in 3 working days, called T+3 settlement

- Trading costs
  Full service brokers charge more than discount brokers

  Fixed-commission schedule - small transactions, for example, $7.95 a trade for up to 1,000 shares

  Negotiated commissions - large transactions (block trade)
  Explicit vs. implicit cost
  Commissions are explicit costs while bid-ask spread is an implicit (hidden) cost
Margin trading and short sales
Types of transactions:
Long purchase - direct buy
Short selling - sale of borrowed securities

Margins:
Margin trading - borrow money and buy stock to magnify returns by reducing the amount of capital that must be put in by investors

Margin requirements - the minimum amount of equity put in by an investor

Initial margin - the minimum amount of equity that must be provided by an investor at the time of purchase, 50% minimum

Maintenance margin - the minimum amount of equity that must be maintained in the margin account at all time, 25% minimum

Margin call - notification of the need to bring additional equity

(1) Buying on margin (borrow money and buy stock):

\[
\text{Margin} = \frac{\text{Market value of stock} - \text{Loan}}{\text{Market value of stock}} = \frac{\text{Equity in account}}{\text{Market value of stock}} \quad (1)
\]

Buying on margin, example 1
Suppose you bought 100 shares of XYZ at $50.00 per share in your margin account. The initial margin is 50% and the maintenance margin is 25%.

a) At what price, will you receive a margin call?
b) If the price drops to $40, what will happen to your account?
c) If the price drops to $30, how much money should you provide to retain the minimum margin requirement?

a) 100*50 = $5,000 (total cost to purchase 100 shares)
   Equity = $2,500 (the amount you provide which is 50% of total cost)
   Loan = $2,500 (the amount you borrow which is 50% of total cost)

Let P be the price at which your maintenance margin drops to 25%, using (1),

\[
\frac{100*P - 2,500}{100*P} = 0.25, \text{ solve for } P = $33.33
\]

If the price drops below $33.33, you will receive a margin call.
b) If the price drops to $40 > $33.33, your account is restricted but there is no margin call.

c) Let X be the amount of money you need to provide to reduce the loan,
\[
\frac{100 \times 30 - (2,500 - X)}{100 \times 30} = 0.25, \text{ solve for } X = \$250
\]

(2) Short sale on margin (you borrow shares from your broker and sell them now)

Rational: you believe the stock is currently overpriced in the market and expect the price will drop in the future.

Up-tick (a price that is higher than that of the previous trade)
Up-tick rule in short sale: a rule designed to restrict short selling from further driving down the price of a stock that has dropped more than 10% in one day. At that point, short selling would be permitted if the price of the security is above the current national best bid (uptick). It will enable long sellers to stand in the front of the line and sell their shares before any short sellers once the circuit breaker (a 10% drop in one day) is triggered.

\[
\text{Margin} = \frac{\text{Value of assets - Loan}}{\text{Value of stock owed}} = \frac{\text{Equity}}{\text{Loan}} \quad (2)
\]

Short sale on margin, example 2
Suppose you short sell 100 shares of ABC at $100 per share in your margin account. The initial margin is 60% and the maintenance margin is 30%.

a) At what price, will you receive a margin call?

b) What will happen if the price rises to $110 per share?

c) If the price drops to $80 per share after your short sale, what is the return from short sale if the interest charge totals $500?

a) \[100 \times 100 = \$10,000 \text{ (short sale proceeds)}\]
\[10,000 \times 60\% = \$6,000 \text{ (the initial margin you should provide which is 60\% of short sale proceeds)}\]
\[\text{Value of assets} = \$16,000\]

Let P be the price at which your margin drops to 30\%, using (2),
\[
\frac{16,000 - 100 \times P}{100 \times P} = 0.30, \text{ solve for } P = \$123.08
\]

If the price rises above $123.08 you will receive a margin call.
b) If the price rises to $110 < $123.08, your account is restricted but you will not receive a margin call.

\[
\text{Money made} = 100 \times (100 - 80) - 500
\]
\[
\text{Money invested} = 6,000
\]

\[
\text{Rate of return} = \frac{100 \times (100 - 80) - 500}{6,000} = 25\%
\]

**ASSIGNMENTS**

1. Concept Checks and Summary
2. Key Terms
3. Intermediate: 14, 15, 21, and CFA 1, 2, 3
Chapter 4 - Mutual Funds and Other Investment Companies

- Investment companies
- Mutual funds
- Costs of investing in mutual funds
- Mutual fund returns
- Investing in mutual funds

- Investment companies
  
  An investment company is a type of financial intermediary. It sells itself to the public and uses the funds to invest in a portfolio of securities.

  Mutual funds are investment companies (open-end).

  Advantages of investing in mutual funds:
  Economies of scale
  Professional management
  Diversification and divisibility
  Record keeping and administration

  NAV: the underlying value on a per share basis of a mutual fund
  It is determined by the closing-bell prices and it varies every day

  NAV = (market value of assets - liabilities) / number of shares outstanding
  For example, a mutual fund has $120 million in assets and 5 million of liabilities. If it has 5 million shares outstanding, the net asset value (NAV) is $23 per share.

  Managed investment companies: open-end vs. closed-end
  Open-end fund: investors can buy shares from or sell shares back to the fund at NAV (it may involve in purchase or redemption charges), with no limit on the number of shares the fund can issue

  Closed-end fund: it is traded at prices that can differ from NAV and the number of shares outstanding is fixed

  Unit investment trust: money pooled from many investors that is invested in a portfolio fixed for the life of the fund

  Hedge fund: a private investment pool, open to wealthy or institutional investors, that is exempt from SEC regulations

  Real estate investment trusts (REITs): similar to closed-end funds that invest in real estate or loans secured by real estate
Mutual funds

Mutual funds are common names for open-end investment companies

More than 90% of mutual funds are open-end funds

Capital gains vs. current income

Investment policy: each fund has its policy contained in the fund’s prospectus

Money market funds: invested in short-term and low-risk instruments

Equity funds: mainly invested in stocks, growth funds vs. income funds

Balanced funds: a balanced return from fixed income securities and long-term capital gains

Bond funds: invested in various bonds, more current income

Index funds: mimic market indexes (for example, S&P 500 index)

Sector funds: restrict investments in particular sectors (for example, financial service sector)

International funds: invested in international stocks

Costs of investing in mutual funds

Operating expenses: costs to operate the fund, including administrative expenses, ranging from 0.2% to 2.0%

Loads: commission charges, sales charges, or redemption charges

Front-end load: deduct a % charge from the initial investment (for example, 5%)

Low-load fund: less than 3% of front charge

Offering price = NAV / (1 – load) or NAV = offering price * (1 - load)

No-load fund: selling at NAV, or offering price = NAV

Back-end load: a commission change on the sale of shares

Other fees: for example, 12b-1 fees to cover marketing and distribution costs
• Mutual fund returns
  Sources of return: dividend income; capital gains distributions; unrealized capital gains

  \[ \text{NAV}_1 - \text{NAV}_0 + I_1 + G_1 \]
  
  Rate of return = \[\text{--------------------------}\]
  \[\text{NAV}_0\]

  \(I_1\): income distribution during the period
  \(G_1\): capital gains distribution during the period

  Note: All fees are deducted directly from NAV

  Example on return of a mutual fund, problem 4-21 on page 105

  At the start of the year: $200 million in assets with no liabilities and 10 million shares outstanding
  At the end of the year: dividend income $2 million; no capital gains distribution; fund price rises by 8%, and 1% of 12b-1 fees is charged at the end of the year

  Answer:
  \(\text{NAV}_0 = $20\)
  \(\text{NAV}_1 = 20(1.08)*(1-0.01) = $21.384\)
  \(I_1 = $0.2\) and \(G_1 = 0\)

  \[
  \begin{align*}
  21.384 - 20.00 + 0.2 &= \frac{\text{21.384} - \text{20.00} + \text{0.2}}{\text{20.00}} \\
  &\text{Rate of return = 7.92%}
  \end{align*}
  \]

• Investing in mutual funds
  Wealth accumulation
  Diversification
  Professional management
  Low cost

  Speculation and short-term trading

  Selection process
  Objectives
  What a fund offers – investment policy
  Main holdings
  Load vs. no-load funds
  Open-end vs. closed-end funds
Taxation on mutual fund income

Turnover ratio: the ratio of the trading activity of a portfolio to the assets of the portfolio

Example: see concept check 4.3

Long-term capital gains
Short-term capital gains
Dividends

If it is a retirement account (Roth IRA, regular IRA, 401K or 403B): all taxes are either exempt or deferred

Exchange-traded funds (ETFs): offshoots of mutual funds that allow investors to trade index portfolios, for example, Spider (SPDR) for S&P 500, Diamonds (DIA) for Dow Jones Industrial Average, Qubes (QQQQ) for NASDAQ 100

• ASSIGNMENTS

1. Concept Checks and Summary
2. Key Terms
3. Intermediate: 11, 12, 13, 21, 22, and 24
Chapter 5 - Return and Risk

- Rates of return
- Risk and risk premium
- Historical return
- Inflation and real return
- Asset allocation

- Rates of return
  Components of return: cash dividend and capital gains (or capital losses)
  
  Total return ($) = return from cash dividend + return from capital gains (or losses)
  
  Total return (%) = dividend yield + capital gain yield

  Holding period return (HPR):
  
  $\frac{\text{Ending price} - \text{Beginning price} + \text{Cash dividend}}{\text{Beginning price}}$
  
  Example
  
  Div = $4$
  
  $P_0 = $100$
  
  $P_1 = $110$
  
  $110 - 100 + 4$
  
  $HPR = \frac{10 + 4}{100} = 10\% + 4\% = 14\%$
  
  Capital gains yield: % change in price, 10%
  
  Dividend yield: % return from dividend, 4%

  Returns over multiple periods

  Table 5-1: Quarterly cash flows and rates of return of a mutual fund

<table>
<thead>
<tr>
<th></th>
<th>1st quarter</th>
<th>2nd quarter</th>
<th>3rd quarter</th>
<th>4th quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets at the start of quarter</td>
<td>1.0 mil</td>
<td>1.2 mil</td>
<td>2.0 mil</td>
<td>0.8 mil</td>
</tr>
<tr>
<td>Holding period return (HPR)</td>
<td>10.0%</td>
<td>25.0%</td>
<td>(20%)</td>
<td>25.0%</td>
</tr>
<tr>
<td>Total assets before net inflow</td>
<td>1.1 mil</td>
<td>1.5 mil</td>
<td>1.6 mil</td>
<td>1.0 mil</td>
</tr>
<tr>
<td>Net inflow</td>
<td>0.1 mil</td>
<td>0.5 mil</td>
<td>(0.8 mil)</td>
<td>0.0 mil</td>
</tr>
<tr>
<td>Assets at the end of quarter</td>
<td>1.2 mil</td>
<td>2.0 mil</td>
<td>0.8 mil</td>
<td>1.0 mil</td>
</tr>
</tbody>
</table>
Arithmetic mean: simple average, the sum of returns in each period divided by the number of periods - best forecast of performance in the future

\[
\text{Arithmetic mean} = \frac{(10 + 25 - 20 + 25)}{4} = 10\%
\]

Geometric mean: time-weighted average return (considers compounding)

\[
(1 + 0.1)*(1+0.25)*(1-0.2)*(1+0.25) = (1 + r_G)^4
\]

Solve for \(r_G = 8.29\%\)

Dollar-weighted average return: internal rate of return for a project

<table>
<thead>
<tr>
<th>Quarter</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net cash flow</td>
<td>-1.0</td>
<td>-0.1</td>
<td>-0.5</td>
<td>0.8</td>
<td>1.0</td>
</tr>
</tbody>
</table>

\[\text{IRR} = 4.17\%\]

APR (annual percentage rate) vs. EAR (effective annual rate)

\[
\frac{\text{EAR}}{\text{APR}} = (1 + \frac{\text{APR}}{n})^n - 1
\]

For example, APR = 6%, n = 4 (quarterly compounding), EAR = 6.14%

- Risk and risk premium
  Probability distribution: a list of possible outcomes with associated probabilities
  Expected return: the mean value of the distribution
  Variance and standard deviation: measure of dispersion around the mean (risk)

Example

<table>
<thead>
<tr>
<th>State of the Economy</th>
<th>Scenario, s</th>
<th>Probability, p(s)</th>
<th>HPR, r(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boom</td>
<td>1</td>
<td>0.25</td>
<td>44%</td>
</tr>
<tr>
<td>Normal</td>
<td>2</td>
<td>0.50</td>
<td>14%</td>
</tr>
<tr>
<td>Recession</td>
<td>3</td>
<td>0.25</td>
<td>-16%</td>
</tr>
</tbody>
</table>

\[\text{Expected return} = E(r) = \sum_{s=1}^{S}p(s) \cdot r(s) = 14\%\]

\[\text{Variance} = \sigma^2 = \sum_{s=1}^{S}p(s) \cdot [r(s) - E(r)]^2 = 450;\]

\[\text{Standard deviation} = \sigma = \sqrt{\sigma^2} = \sqrt{450} = 21.21\%\]
Risk premium: expected return in excess of the risk-free rate, an additional return to compensate for taking risk.

Risk aversion: reluctant to accept risk

\[ E(r_p) - r_f = \frac{1}{2} A \sigma_p^2, \]

where \( A \) is the risk aversion coefficient or \( A = \frac{E(r_p) - r_f}{\frac{1}{2} \sigma_p^2} \).

For example, if the risk premium is 8%, the standard deviation is 20%, then the risk aversion coefficient \( A = 4 \). The higher the risk aversion is for an investor, the higher the value of \( A \), and the higher the risk premium.

Sharpe (reward-to-volatility) measure = \( S = \frac{E(r_p) - r_f}{\sigma_p} = \frac{8\%}{20\%} = 0.4 \)

(more discussions in Chapter 18)

- Historical return
  - Using historical data to estimate mean and standard deviation

Example: MO

Historical returns: summary statistics for the U.S market and the world during 1926 - 2008 (Table 5.2 - Digital Image)

Interpretation of the numbers
  - Normal distribution: 68.26% (1 \( \sigma \) rule), 95.44% (2 \( \sigma \) rule), and 99.74% (3 \( \sigma \) rule)

Size effect: average returns generally are higher as firm size declines

(Figure 5.1 - Digital Image)
• Inflation and real return
  Nominal interest rate vs. real interest rate
  \( r \approx R - i \) (the real rate, \( r \) is approximately equal to the nominal rate, \( R \) minus the inflation rate, \( i \))

  \[ R = r + E(i) \]

  Nominal interest rate = the real interest rate + expected inflation rate

  Inflation rate is measured by consumer price index (CPI)

  U.S. history of interest rates, inflation, and real interest rates

  (Figure 5.5 and Table 5.4 - Digital Image)

• Asset allocation
  Asset allocation: portfolio choice among different investment classes

  Risky assets vs. risk-free assets
  All risky assets form a value-weighted risky portfolio, \( P \)
  All risk-free assets form a risk-free asset with a risk-free rate, \( r_f \)

  Complete portfolio: a portfolio including risky assets and risk-free assets

  Complete portfolio’s expected return and risk:

  \[
  E(r_c) = y \cdot E(r_p) + (1 - y) \cdot r_f \quad \text{and} \quad \sigma_c = y \cdot \sigma_p
  \]

  Where \( E(r_c) \) and \( \sigma_c \) are the expected rate of return and standard deviation for a complete portfolio, \( E(r_p) \) and \( \sigma_p \) are the expected rate of return and standard deviation for the risky assets, \( r_f \) is the return on the risk-free asset, \( y \) is the weight on risky-assets, and \( 1 - y \) is the weight on the risk-free asset.
The capital allocation line (CAL): a plot of risk-return combinations available by varying portfolio allocation (weights) between the risk-free asset and the risky portfolio.

Example: $E(r_p) = 15\%, \sigma_p = 22\%, \ r_f = 7\%, \ y = 50\%$, then

$E(r_c) = 11\%, \sigma_c = 11\%$, the Sharpe measure $= S = \frac{15\% - 7\%}{22\%} = 0.36$

Challenge: if $y = 1.5$ what will happen to the complete portfolio? Where is it located on CAL? What is $S$? What does it mean ($y = 1.5$)?

Risk aversion vs. risk tolerance

Passive investment strategy: holding a combination of a well-diversified market portfolio and a risk-free portfolio, assuming all risky assets are fairly priced in the market.

Capital market line (CML): a capital allocation line using the market index portfolio as the risky portfolio (more discussions in Chapters 6 and 7)

**ASSIGNMENTS**

1. Concept Checks
2. Key Terms
3. Intermediate: 5, 6, 12-16, and CFA 1-6
Chapters 6&7 - Efficient Diversification, CAPM and APT

- Diversification and portfolio risk
- Portfolio construction with two risky assets
- Modern portfolio theory
- Beta coefficient
- Capital asset pricing model (CAPM)
- Arbitrage pricing theory (APT)

- Diversification and portfolio risk
  Risk of holding a single asset:

  Probability distribution (a revisit)

  Expected return: $E(r)$

  Variance ($\sigma^2$) and standard deviation ($\sigma$)

  Mean or $E(r)$

  Mean or $E(r)$ determines the center of the distribution while $\sigma$ (or $\sigma^2$) determines how wide the distribution is. The larger the $\sigma$, the wider the distribution, and the higher the risk.

  Risk of holding a portfolio: standard deviation of returns of the portfolio

  As the number of stocks increases in a portfolio, the portfolio’s total risk, $\sigma_p$, decreases. It is known as the diversification effect.

  Portfolio’s total risk = firm’s specific risk + market risk
  = Diversifiable risk + non-diversifiable risk
  = non-systematic risk + systematic risk

  (Figure 6.1 - Digital Image)
Portfolio construction with two risky assets
Example: portfolio construction with two risky assets

<table>
<thead>
<tr>
<th>State of economy</th>
<th>Probability (p)</th>
<th>( r_A )</th>
<th>( r_B )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recession</td>
<td>0.3</td>
<td>100%</td>
<td>-10%</td>
</tr>
<tr>
<td>Normal</td>
<td>0.4</td>
<td>15%</td>
<td>0%</td>
</tr>
<tr>
<td>Boom</td>
<td>0.3</td>
<td>-70%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Estimate the distribution for each stock

\[
E(r_A) = 15\%, \quad \sigma^2_A = 4,335 \quad \text{and} \quad \sigma_A = 65.84\% \quad (\text{refer to Chapter 5})
\]

\[
E(r_B) = 6\%, \quad \sigma^2_B = 264 \quad \text{and} \quad \sigma_B = 16.25\% \quad (\text{refer to Chapter 5})
\]

Estimate the correlation between two risky assets

Covariance: \[ \sigma_{AB} = \sum_{i=1}^{S} p(i) \left[ (r_A(i) - E(r_A)) \right] \left[ (r_B(i) - E(r_B)) \right] = -1,020 \]

Since \( \sigma_{AB} = (\rho_{AB}) \sigma_A \sigma_B \), where \( \rho_{AB} \) is called correlation coefficient

Correlation coefficient, \( \rho_{AB} = -0.953 \)

\( \rho_{AB} = 1 \rightarrow \text{perfectly and positively}; \quad 0 < \rho_{AB} < 1 \rightarrow \text{positively but not perfectly}; \)

\( \rho_{AB} = 0 \rightarrow \text{no correlation}; \quad -1 < \rho_{AB} < 0 \rightarrow \text{negatively but not perfectly}; \)

\( \rho_{AB} = -1 \rightarrow \text{perfectly and negatively} \)
What will the diagrams look like if \( 0 < \rho_{AB} < 1 \), -1 < \( \rho_{AB} < 0 \), and \( \rho_{AB} = 0 \)?

Portfolio’s return and risk

Three rules for two-risky-assets portfolio

(1) The return on a portfolio is a weighted average of the returns on the component securities (A and B), with the investment proportion as weights;

\[
 r_p = w_A r_A + w_B r_B
\]

(2) The expected return on a portfolio is a weighted average of the expected returns on the component securities (A and B), with the investment proportion as weights;

\[
 E(r_p) = w_A E(r_A) + w_B E(r_B)
\]

(3) The variance of the portfolio is given by

\[
 \sigma_p^2 = (w_A \sigma_A)^2 + (w_B \sigma_B)^2 + 2(w_A \sigma_A)(w_B \sigma_B)\rho_{AB}
\]

\[
 = (w_A)^2 (\sigma_A)^2 + (w_B)^2 (\sigma_B)^2 + 2(w_A w_B)\sigma_{AB}
\]

\[
 = (w_A)^2 (\sigma_A)^2 + (w_B)^2 (\sigma_B)^2 + 2(w_A w_B)\sigma_A \sigma_B \rho_{AB}
\]

Suppose you invest 10% in stock A and 90% in stock B. What is the expected rate of return of the portfolio? What is the standard deviation of the return of the portfolio?

\[
 E(r_p) = 6.9\%, \quad \sigma_p^2 = 73.59, \quad \text{and} \quad \sigma_p = 8.58\%
\]
If you compare stock B with the portfolio, what do you find? The portfolio dominates stock B in both risk (lower risk) and return (higher expected return).

Let us construct more portfolios by changing weights.

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>% in A</th>
<th>% in B</th>
<th>$E(r_p)$, %</th>
<th>$\sigma_p$, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td>0</td>
<td>15.00</td>
<td>65.84</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td>25</td>
<td>12.75</td>
<td>45.52</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>50</td>
<td>10.50</td>
<td>25.29</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>75</td>
<td>8.25</td>
<td>6.08</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>100</td>
<td>6.00</td>
<td>16.25</td>
</tr>
<tr>
<td>6</td>
<td>19.34</td>
<td>80.66</td>
<td>7.74</td>
<td>3.96</td>
</tr>
</tbody>
</table>

Plot all the portfolios in a diagram.

How to determine the weights for MVP?

By choosing the optimal weights you minimize the variance (risk):

$$w_B = \frac{\sigma_A^2 - \rho_{AB} \sigma_A \sigma_B}{\sigma_A^2 + \sigma_B^2 - 2 \rho_{AB} \sigma_A \sigma_B}; \quad \text{and} \quad w_A = 1 - w_B \quad \text{(for two risky assets)}$$

Effect of $\rho_{AB}$ (correlation coefficient), refer to Figure 6.4 - Digital Image.
\( \rho_{AB} = -1 \), perfectly negative correlation, perfect diversification

\( \rho_{AB} = 1 \), perfectly positive correlation, no diversification

\(-1 < \rho_{AB} < 1\), there are benefits to diversification. Where negative correlation is present, there will be even greater diversification benefits.

- Modern portfolio theory
  - Markowitz mean-variance model (for n risky assets)
    - Efficient portfolio - a portfolio with the highest expected return for a given level of risk or a portfolio with the lowest risk for a given expected return
    - Efficient frontier – the set of efficient portfolios
    - MVP – minimum variance (risk) portfolio
    - Investment opportunity set: the set of all attainable portfolios, including efficient and inefficient portfolios

\[ E(r_p) \]

\[ \sigma_p \]

Indifference curves: curves describing investor’s preferences for risk and return, or representing a set of combinations of risk and return that provides the same level of satisfaction

Nonsatiation: more is preferred to less

Risk aversion: most investors are risk-averse

Utility: a measure of the level of satisfaction
Mean-variance criterion: investors desire portfolios that lie to the “northwest”, which means that investors prefer higher return with less risk.

$I_2$ is preferred to $I_1$ because $I_2$ provides a higher level of satisfaction (lower risk with same return, i.e., A is better than B, or higher return with same risk, i.e., C is better than D).

Choosing the optimal portfolio by combining the indifference curves with the efficient set.

$O^*$ is the optimal choice (tangency point) where the utility (satisfaction) is maximized.

Points to remember:
- All portfolios on the efficient set are “equally” good
- All risky assets with no borrowing or lending opportunities
- Different investors may have different estimated efficient set
- Different investors may have different indifference curves
When there is a risk-free asset in the market and borrowing and lending are allowed

Portfolio returns and risk

\[ E(r_p) \]

New efficient set

CML

When a risk-free asset exists, there is a risk-free rate, \( r_f \). We can draw a line from \( r_f \), which is tangent to the original efficient set at point M. The line is called the Capital Market Line (CML), which becomes the new efficient set. The optimal choice for the investor is point O* because the indifference curve is tangent to the new efficient set (CML) at that point.

Capital Market Line (CML) - concepts, formulas, and implication

\[ E(r_p) = r_f + \frac{(E(r_m) - r_f)}{\sigma_m} \sigma_p \] : It is the Capital Market Line (CML) formula

CML has the risk-free rate as the intercept and the reward-to-variability ratio as the slope
Two-fund separation theorem - all investors hold a combination of the risk-free asset and a well-diversified market portfolio, which includes all risky assets in the market (market value weighted)

Asset allocation line revisited: the risky portfolio actually is a well-diversified market portfolio

\[ E(r_C) = y*E(r_m) + (1-y)*r_f \]

Where \( y \) is the weight on the market portfolio and \( (1-y) \) is the weight on the risk-free asset

Rearranging: \( E(r_C) - r_f = y*(E(r_m) - r_f) = y*E(r_m) - y*r_f \)

\[ \sigma_C = y*\sigma_m \]

For example, given \( E(r_m) = 12\% \), \( \sigma_m = 20\% \), \( r_f = 5\% \)

If \( y = 60\% \), \( E(r_C) = y*E(r_m) + (1-y)*r_f = 0.6*12\% + 0.4*5\% = 9.2\% \)

\[ \sigma_C = y*\sigma_m = 0.6*20\% = 12\% \]

- Beta coefficient
  A measure of the market risk (systematic risk) for a stock or a portfolio

\[ \beta_{i,m} = \frac{\sigma_{i,m}}{\sigma_m^2} = \rho_{i,m} \frac{\sigma_i}{\sigma_m} \]

Characteristic line (CL): a regression line used to estimate the beta coefficient

The slope of the CL is the estimated beta coefficient for stock \( i \)

Example: MO
Single index model

Asset returns are related to the returns of a market index

Excess return: rate of return in excess of the risk-free rate ($R = r - r_f$)

$$R_i = a_i + \beta_i * R_m + \varepsilon_i,$$

where $\varepsilon_i$ is an error term and the average of error terms is zero.

Taking the variance on both sides of the single index model:

$$\sigma_i^2 = \beta_i^2 \sigma_m^2 + \sigma_{\varepsilon}^2$$

Total risk = market risk + specific risk

= systematic risk + firm’s specific risk

$$\rho^2 = \frac{\beta_i^2 \sigma_m^2}{\sigma_i^2}$$

is the proportion of total variance attributed to market fluctuations

Example: In a CAPM equilibrium, the risk-free rate is 5% and the expected rate of return on the market is 10% with a standard deviation of 18% ($\sigma_m = 18\%$). A common stock $i$ has an expected return of 12% with a standard deviation of 30% ($\sigma_i = 30\%$). What percentage of the total risk for stock $i$ is the firm’s specific risk? What percentage is due to the market risk?

Answer

Step 1: Solve for the beta of stock $i$, using CAPM

$$12\% = 5\% + \beta_i (10\% - 5\%)$$

solving for $\beta_i = 1.4$

Step 2: Solve for the firm’s specific risk, using the formula above,

$$900 = (1.4)^2(18)^2 + \sigma_{\varepsilon}^2$$

solving for $\sigma_{\varepsilon}^2 = 264.96$

Step 3: Calculate the percentages,

$$264.96/900 = 29.44\%$$

(firm’s specific), $635.04/900 = 70.56\%$ (market)
Capital asset pricing model (CAPM)
Assumptions: many investors, homogeneous expectations, one-period utility maximization, perfect capital markets, risk-free borrowing and lending, and capital markets in equilibrium

It relates the required (expected) return to the market risk, or beta

\[ E(r_i) = r_f + \beta_i[E(r_m) - r_f] \]
CAPM model

\[
\begin{align*}
E(r_i) & \quad \text{SML} \\
rf & \quad \text{Slope} = E(r_m) - r_f \\
\beta_i & \\
\end{align*}
\]

Intercept = risk-free rate
Slope = market risk premium
SML - the graphical presentation of CAPM

Over-and-under valued securities

Example: MO

Beta of MO is 0.86, if expected return on the market is 12% and the risk free rate is 5%, the required rate of return for MO is

\[ 5\% + 0.86\times(12\% - 5\%) = 11.02\% \]

Checking the average return over the past 5 years we find that it is 1.22% per month or 14.64% per year (simple interest)

The stock’s alpha = 14.64% – 11.02% = 3.62% (under priced) since the realized return is higher than the CAPM predicts (above the SML)

Limitations with CAPM: rely on the market portfolio and expected returns
Arbitrage pricing theory (APT)
An equilibrium model of expected returns with multi-factors

Multi-factor model:

\[ R_i = a_i + \beta_{i1} R_{m1} + \beta_{i2} R_{m2} + \ldots + \beta_{ik} R_{mk} + \varepsilon_i \]

For example, firm size, book-to-market ratio, default-risk, etc.

Arbitrage: the process of earning risk-free profit by taking the advantage of mispricing in a particular asset

Three characteristics for arbitrage
1. No initial investment from pocket
2. No risk
3. Positive return

APT model

\[ r_i = r_f + \beta_{i1} (\delta_1 - r_f) + \beta_{i2} (\delta_2 - r_f) + \ldots + \beta_{ik} (\delta_k - r_f) + \varepsilon_i \]

Applications
Single index model: consider market factor to estimate beta of GM and use CAPM to estimate the required rate of return of GM
1. Collect data (monthly returns of GM, S&P 500 index monthly returns, and monthly T-bill rates from January 1999 to December 2003, 60 observations)
2. Calculate Excess returns of GM and S&P 500 \( R = r - r_f \)
3. Run the regression: \( R_{GM} = a_{GM} + \beta_{GM} * R_m + \varepsilon_i \)
4. Look for slope = 1.24
5. Then use CAPM to estimate the expected return of GM: \( E(r_i) = r_f + \beta_{im} (E(r_M) - r_f) \)
6. Assume \( r_f = 4.00\% \), market risk premium = 5.5\%, expected return = 10.82\%

Two factor model of Merton: consider market factor and interest rate factor to estimate betas and use multifactor model to estimate expected return of GM
1. Collect data
2. Run the regression: \( R_i = a_i + \beta_{im} R_m + \beta_{itb} R_{tb} + \varepsilon_i \) to estimate betas
3. Use the two-factor model to estimate expected rate of return \( E(r_i) = r_f + \beta_{im} (E(r_M) - r_f) + \beta_{itb} (E(r_{tb}) - r_f) \)
Assume that the risk-free rate is 4.00%, the expected market risk premium is 6% and the expected interest rate risk premium is 3%. If the market beta of stock $i$ is 1.2 and interest rate beta of the stock is 0.7, the expected return for stock $i$ is

$$E(r_i) = 4\% + 1.2*(6\%) + 0.7*(3\%) = 13.3\%$$

Three factor model of Fama and French: considers market factor, size factor, and book-to-market ratio

1. Collect data and run a multifactor regression:
   $$r_i - r_f = \alpha_i + \beta_{IM} * (r_M - r_f) + \beta_{HML} * r_{HML} + \beta_{SMB} * r_{SMB} + \epsilon_i$$
   to estimate betas for stock $i$

2. Use three-factor model to estimate expected rate of return for stock $i$
   $$E(r_i) = r_f + \beta_{IM} * [E(r_M) - r_f] + \beta_{HML} * E(r_{HML}) + \beta_{SMB} * E(r_{SMB})$$

3. Assuming for Dell (using monthly data over the period 2002-2006),
   $\beta_{i,M} = 1.132$, $\beta_{HML} = -0.8026$, and $\beta_{SMB} = 0.2742$
   From French’s website, $r_M - r_f = 7.99\%$, $r_{HML} = 4.40\%$, and $r_{SMB} = 2.94\%$,
   then Dell’s expected risk premium
   $$E(r_{Del}) - r_f = 1.132*7.99\% - 0.8026*4.40\% + 0.2742*2.94\% = 6.32\%$$

**ASSIGNMENTS**

Chapter 6
1. Concept Checks
2. Key Terms
3. Intermediate: 8-12 and CFA 1-3

Chapter 7
1. Concept Checks
2. Key Terms
3. Intermediate: 4-7, 17-19, and CFA 1-14
Chapter 8 - Market Efficiency

- Random walks and efficient market hypothesis (EMH)
- Implications of EMH
- The role of portfolio manager in an efficient market
- Evidence of market efficiency and anomalies
- Interpretation of EMH

- Random walks and efficient market hypothesis (EMH)
  Random walk: stock price changes are random and unpredictable
  Efficient market: prices of securities in the market fully and quickly reflect all available information, which means that there is no arbitrage opportunity

Figures 8.1 and 8.2 - Digital Image

Forms of efficiency:
Weak-form efficiency: stock prices already reflect all information contained in the history of past trading

Semistrong-form efficiency: stock prices already reflect all publicly available information in the market

Strong-form efficiency: stock prices already reflect all relevant information in the market, including inside information

- Implications of EMH
  Technical analysis vs. fundamental analysis

  Technical analysis: research on recurrent and predictable patterns in the market

  Relative strength: compare the recent performance of a stock with that of the market or other stocks

  Resistance level: a price level above which it is supposedly unlikely for a stock or stock index to rise

  Support level: a price level below which it is supposedly unlikely for a stock or stock index to fall

  Moving averages: 50-day and 200-day moving averages

  If the market is efficient, what will happen to technical analysis?
Fundamental analysis: research on determinants of stock value, such as earnings and dividends prospects, expectations of future interest rates, and risk of the firm.

Active vs. passive portfolio management

Active: search for mispriced (overvalued or undervalued) securities, buy and sell often to timing the market

Passive: buy and hold a well-diversified portfolio, buy and hold strategy

- The role of portfolio manager in efficient market
  Diversification to reduce firm’s specific risks

  Tax consideration for different investors

  Resource allocation

  Demand for investment varies with age, tax bracket, risk aversion, and employment, etc., so portfolio managers can tailor portfolios for different investors.

- Evidence of market efficiency and anomalies
  Three main issues
  (1) The magnitude issue: fund managers deal with portfolios worth hundreds of millions. Only one tenth of 1% will be worth a lot.
  (2) Selection bias: if a manager knows a way to make money for sure, he/she will keep it secret.
  (3) Lucky event: sometimes, a fund has a superior performance. It can just be a lucky event (bet the right stocks).

  Weak-form tests: patterns in stock returns
  Serial correlation test: involves measuring the correlation between stock returns for various lags and the results indicate fairly weak and positive correlation for short-horizon returns and fairly strong and negative correlation for long-horizon returns

  Momentum effect: the tendency of poorly-performing stocks and well-performing stocks in one period to continue that abnormal pattern in following periods

  Buying past winners and selling past losers will make abnormal profits

  Reversal effect: the tendency of poorly performing stocks and well-performing stocks in one period to experience reversals in the following period
  Implication: short- and intermediate-horizon momentum and long-run reversal
Semi-strong form tests: market anomalies
Anomalies: patterns that seem to contradict the EMH

P/E ratio effect: low P/E ratio stocks have earned higher average risk-adjusted returns than high P/E ratio stocks

Small-firm effect: small firm stocks have earned higher abnormal returns, primary in January

Figure 8.3 - Digital Image

Neglected-firm effect: less well-known firm stocks have earned abnormal returns

Book-to-market effect: high book-to-market value stocks have earned abnormal returns

Figure 8.4 - Digital Image

Post-earnings-announcement price effect: stock prices don’t reflect new information rapidly

Figure 8.5 - Digital Image

Strong-form tests: inside information
Insiders make superior profits with inside information: the market is not strong-form efficient

- Interpretation of EMH
  Risk premium or inefficiency?

  For example, Fama and French’s three factor model indicates higher returns are associated with more risks

  Anomalies or data mining?

- ASSIGNMENT
  1. Concept Checks
  2. Key Terms
  3. Intermediate: 10-16 and CFA 1-6