Slides 4 - Mutual Funds and Other Investment Companies

1. a. An investment company is a company that _____.

   - ○ invests its own money in a variety of real assets
   - ○ invests its own money in a variety of securities
   - ○ invests money raised from investors in a variety of real assets
   - ◉ invests money raised from investors in a variety of securities

   An investment company is a company that pools money from investors and invests it in a variety of securities. Mutual funds are an example of an investment company.

2. a. Which are types of mutual funds?

   Check all that apply:

   - ☑ Balanced or hybrid funds
   - ☑ Bond funds
   - ☑ Money market funds
   - ☐ Private equity funds
   - ☑ Stock funds

   Private equity funds are not mutual funds, since they are typically not open to retail investors and don't allow for the withdrawal of money during long periods.

3. a. Which statements are true about index funds?

   Check all that apply:

   - ☑ Index funds are considered passive investment vehicles.
   - ☑ Index funds are unmanaged.
   - ☐ Index fund managers try to identify under- or overvalued securities.
   - ☐ Index funds try to beat their relevant benchmark.
   - ☑ Index funds try to replicate the investment performance of a particular index.

   An investment in an index funds is considered a passive investment, since index funds are unmanaged. Instead of doing security analysis to identify mispriced securities, the manager of an index fund just buys all the assets that are included in the index, in the same proportion as in the index. Doing so will replicate the investment performance of the index.

4. a. Which are advantages of ETFs over conventional mutual funds?

   Check all that apply:

   - ☐ ETFs have lower risk than conventional mutual funds.
   - ☑ ETFs have lower expense ratios than actively managed mutual funds.
   - ☑ ETFs offer a potential tax advantage.
   - ☑ ETFs trade continuously on an exchange.
   - ☑ ETFs can be bought on margin and sold short.

The risk of an ETF or mutual fund depends only on the composition of its portfolio. Therefore, there are many ETFs that are riskier than some mutual funds.

5. a. Which statements are true about equity funds?

   Check all that apply:

   - [x] Each fund has a specified investment policy, described in the fund's prospectus.
   - [x] Growth funds are typically riskier than income funds.
   - [x] They commonly hold about 5% of total assets in money market securities.
   - [ ] They invest primarily in private equity.

   Equity funds invest primarily in publicly traded stocks (equities).

6. A mutual fund has a portfolio worth $363 million. The fund has issued 534 million shares to fund shareholders.

   a. What is the net asset value (NAV) per share?

   `"NAV per share" = "Market value of assets" /"Number of shares"= 363 / 534=` **0.6798**

7. Silver Star's Foreign Markets fund has a portfolio of $240 million and liabilities of $5 million. The fund has sold 6 million shares to fund shareholders.

   a. What is the net asset value (NAV) per share?

   Net asset value:
   NAV = Assets - Liabilities
   = 240 - 5
   = 235 (million)

   Net asset value per share:
   NAV per share = NAV / Number of shares
   = 235 / 6
   = **39.17**

   b. A large shareholder redeems 600,000 shares. What is the new NAV per share?

   The shareholders gets 0.6 million * $39.17 = $23.5 million. There are now only 5.4 million shares outstanding.

   The remaining assets are thus
   Assets = 240 - 23.5 = 216.5 (million)

   NAV = Assets - Liabilities
   = 216.5 - 5
   = 211.5 (million)

   NAV per share = NAV / Number of shares
   = 211.5 / 5.4
   = **39.17**

   This is the same NAV per share as before. The other shareholders of the mutual fund are not affected by share redemptions or purchases.

8. A mutual fund owns the following stocks: 14,000 shares of General Electric, 22,000 shares of IBM, and 64,000 shares of Exxon Mobile. The fund has to pay back-wages of $440,000, and has issued 2 million shares to mutual fund shareholders. The fund will receive a dividend of $10 per share from its holdings of General Electric stock in two weeks, which the fund manager will reinvest by buying more shares of GE. Ignore tax effects.

The stock prices for GE, IBM, and Exxon are as follows, respectively:

Time	GE	IBM	Exxon
10am	616	150	208
End of the day	619	145	215
14 days later	625	143	206

a. What is the value of the fund's holdings of Exxon at the end of the day?

Value of a stock position:
$V_E = P_E * Q_E$
= 215 * 64,000
= **13,760,000**

b. What is the total NAV (not per share) at the end of the day?

We need to calculate the value for GE and IBM, too:
$V_{GE} = P_{GE} * Q_{GE}$ = 619 * 14,000 = 8,666,000
$V_I = P_I * Q_I$ = 145 * 22,000 = 3,190,000.

Total net asset value:
NAV = $V_E + V_{GE} + V_I$ - Liabilites
= 13,760,000 + 8,666,000 + 3,190,000 -440,000
= **25,176,000**

c. What is the NAV per share at the end of the day?

`"NAV per share" = (NAV)/ "Number of shares issued"= 25,176,000/(2,000,000)=` **12.588**

d. If you place an order to buy 100 shares in the fund at 10am, how much will you have to pay?

Shares in mutual funds are sold (and bought back) at the NAV at day's end (after the end of trading).

You have to pay 100 * $12.588 = $**1,258.8**.

9. A mutual fund has the following holdings:

Company	AAPL	FB	GOOG
Shares owned	52,000	130,000	170,000
Stock price	219	196	1,096

The fund has issued 516,000 shares to investors.

a. What is the NAV per share?

Value of assets:

`V = N_1 * P_1 + N_2 * P_2 + N_3 * P_3`

= `52,000*219 + 130,000*196 + 170,000*1,096`

= 223,188,000

Net asset value per share:

`"NAV per share" = "Assets"/ "Number of shares"= 223,188,000/(516,000)=` **432.53**

b. If the fund sells for $445.51, what is the front-end load as a fraction of the offering price?

Front-end load in dollars:

`FEL = "Offering price" - "NAV" = 445.51 - 432.53 = 12.976`

Front-end load as a fraction of the offering price:

`"FEL"/"Offering price" = 12.976/445.51 =` **0.02913**

10. A mutual fund has a portfolio worth $2.65 million consisting of 50,000 shares of company A at a price of $36 per share and 50,000 shares of company B at a price of $17 per share. The fund sold 50,000 shares of company B and used the proceeds to buy 20,000 shares of company C at a price of $42.5.

    a. What is the portfolio turnover of the mutual fund?

    Trades:
    Trades = Number of shares traded * Price per share
    = 50,000 * 17
    = 0.85 (million)

    Turnover:
    Trades / Portfolio value
    = 0.85 / 2.65
    = **0.3208**

11. Antarctic Growth Fund is a closed-end mutual fund with assets of $409 million and liabilities of $18 million. The fund's 10 million shares currently sell for $37.77 per share.

    a. What is the net asset value per share?

    Net asset value per share:

    `"NAV" = ("Assets" - "Liabilities") / "Shares outstanding"= (409 - 18) / 10 =` **39.1**

    b. What is the premium (discount) as a fraction of the net asset value? Enter a premium as a positive decimal number and a discount as a negative decimal number (no percentages).

    Premium (discount):

    `("Price" - "NAV") / "NAV"= (37.77 - 39.1) / 39.1=` **-0.03402**

12. At the beginning of the year, a fund owned 200,000 shares at a price of $14 per share. After one year, the fund received a dividend of $0.9 per share, and the value of the stocks in the portfolio increased by 10%.

    a. What is the rate of return for the year?

    NAV at the end of the year:

    `NAV_1 = NAV_0 (1+g)`
    = `14 (1+0.1)`
    = 15.4

    Rate of return:

    `r = (NAV_1 - NAV_0 + "Income and Capital gain distributions")/ (NAV_0)`

    = `(15.4 - 14 + 0.9)/ 14`

    = **0.16429**

    b. What would have been the net rate of return if the fund had an expense ratio of 0.75%?

NAV at the end of the year:

`NAV_1 = NAV_0 (1+g) (1-f)`
= `14 (1+0.1) (1-0.0075)`
= 15.285

Rate of return:

`r = (NAV_1 - NAV_0 + "Income and Capital gain distributions")/ (NAV_0)`

= `(15.285 - 14 + 0.9)/ 14`

= **0.15604**

13. Infinity is a closed-end mutual fund with assets of $174 million and liabilities of $6 million. The fund's 7 million shares currently sell for $25 per share.

    a. What is the premium (discount) as a fraction of the net asset value? Enter a premium as a positive decimal number and a discount as a negative decimal number (no percentages).

    Net asset value per share:

    `"NAV" = ("Assets" - "Liabilities") / "Shares outstanding"= (174 - 6) / 7 = 24`

    Premium (discount):

    `("Price" - "NAV") / "NAV"= (25 - 24) / 24=` **0.04167**

14. You invested $1,000 in a mutual fund with a 5% front-end load and an expense ratio of 1%. Expenses are paid at the end of each year. The fund produced an annual return of 8% before fees.

    a. What will be the value of your investment after 5 years?

    Future value of your $1,000 investment:

    `FV = PV (1-FEL) * ((1+r)(1-e))^N`

    = `1,000 (1-0.05) * ((1+0.08)(1-0.01))^5`

    = **1,327.45**

15. You invested in a fund with an expense ratio of 0.8%. The fund also charges a front-end load of 1.75% and 12b-1 fee of 0.3%.

    a. If the rate of return on the fund's portfolio is 8% per year (before fees), what is your net holding period return over 7 years (after fees)?

    Net holding period return:

    = ` (1 - "Front-end load") [(1+r) (1-"Expense ratio"-"12b-1 fee")]^7- 1`

    = `(1 - 0.0175) [(1 + 0.08) (1 - 0.008 - 0.003)]^7- 1`

    = **0.5584**