For both risk and return, increasing order is \( b, c, a, d \). On average, the higher the risk of an investment, the higher is its expected return.

2. Since the price didn’t change, the capital gains yield was zero. If the total return was four percent, then the dividend yield must be four percent.

3. It is impossible to lose more than –100 percent of your investment. Therefore, return distributions are cut off on the lower tail at –100 percent; if returns were truly normally distributed, you could lose much more.

4. To calculate an arithmetic return, you simply sum the returns and divide by the number of returns. As such, arithmetic returns do not account for the effects of compounding. Geometric returns do account for the effects of compounding. As an investor, the more important return of an asset is the geometric return.

5. Blume’s formula uses the arithmetic and geometric returns along with the number of observations to approximate a holding period return. When predicting a holding period return, the arithmetic return will tend to be too high and the geometric return will tend to be too low. Blume’s formula statistically adjusts these returns for different holding period expected returns.

6. T-bill rates were highest in the early eighties since inflation at the time was relatively high. As we discuss in our chapter on interest rates, rates on T-bills will almost always be slightly higher than the rate of inflation.

7. Risk premiums are about the same whether or not we account for inflation. The reason is that risk premiums are the difference between two returns, so inflation essentially nets out.

8. Returns, risk premiums, and volatility would all be lower than we estimated because after-tax returns are smaller than pretax returns.

9. We have seen that T-bills barely kept up with inflation before taxes. After taxes, investors in T-bills actually lost ground (assuming anything other than a very low tax rate). Thus, an all T-bill strategy will probably lose money in real dollars for a taxable investor.

10. It is important not to lose sight of the fact that the results we have discussed cover over 70 years, well beyond the investing lifetime for most of us. There have been extended periods during which small stocks have done terribly. Thus, one reason most investors will choose not to pursue a 100 percent stock (particularly small-cap stocks) strategy is that many investors have relatively short horizons, and high volatility investments may be very inappropriate in such cases. There are other reasons, but we will defer discussion of these to later chapters.

B-2 SOLUTIONS -

**Solutions to Questions and Problems**

*NOTE: All end of chapter problems were solved using a spreadsheet. Many problems require multiple steps. Due to space and readability constraints, when these intermediate steps are included in this*
solutions manual, rounding may appear to have occurred. However, the final answer for each
problem is
found without rounding during any step in the problem.

Core Questions
1. Total dollar return = 100($97 – 89 + 1.20) = $920.00
Whether you choose to sell the stock or not does not affect the gain or loss for the year, your
stock is
worth what it would bring if you sold it. Whether you choose to do so or not is irrelevant
(ignoring
commissions and taxes).
2. Capital gains yield = ($97 – 89)/$89 = 8.99%
Dividend yield = $1.20/$89 = 1.35%
Total rate of return = 8.99% + 1.35% = 10.34%
3. Dollar return = 750($81.50 – 89 + 1.20) = $4,275.00
Capital gains yield = ($81.50 – 89)/$89 = –8.43%
Dividend yield = $1.20/$89 = 1.35%
Total rate of return = –8.43% + 1.35% = –7.08%
4. a. average return = 5.8%, average risk premium = 2.0%
b. average return = 3.8%, average risk premium = 0%
c. average return = 12.2%, average risk premium = 8.4%
d. average return = 16.9%, average risk premium = 13.1%
5. Jurassic average return = (–8% + 34% – 16% + 8% + 19%) / 5 = 7.40%
Stonehenge average return = (–18% + 27% – 9% + 24% + 17%) / 5 = 8.20%
6. Stock A: RA = (0.24 + 0.06 – 0.08 + 0.19 + 0.15)/5 = 0.56 / 5 = 11.20%
Var = 1/4[(.24 – .112)^2 + (.06 – .112)^2 + (.08 – .112)^2 + (.19 – .112)^2 + (.15 – .112)^2] = 0.015870
Standard deviation = (0.015870)1/2 = 0.1260 = 12.60%
Stock B: RB = (0.32 + 0.02 – 0.15 + 0.21 + 0.11)/5 = 0.51 / 5 = 10.20%
Var = 1/4[(.32 – .102)^2 + (.02 – .102)^2 + (.15 – .102)^2 + (.21 – .102)^2 + (.11 – .102)^2] = 0.032370
Standard deviation = (0.032370)1/2 = 0.1799 = 17.99%
7. The capital gains yield is ($74 – 66)/$74 = –.1081 or –10.81% (notice the negative sign). With
a
dividend yield of 2.4 percent, the total return is –8.41%.
9. Arithmetic return = (.29 + .11 + .18 –.06 – .19 + .34) / 6 = .1117
Geometric return = [(1 + .18)(1 + .11)(1 + .18)(1 – .06)(1 – .19)(1 + .34)](1/6) – 1 = .0950
CHAPTER 1 B-3

Intermediate Questions
10. That’s plus or minus one standard deviation, so about two-thirds of the time or two years out
of
three. In one year out of three, you will be outside this range, implying that you will be below it
one
year out of six and above it one year out of six.
11. You lose money if you have a negative return. With an 8 percent expected return and a 4
percent
standard deviation, a zero return is two standard deviations below the average. The odds of being
outside (above or below) two standard deviations are 5 percent; the odds of being below are half
that, or 2.5 percent. (It’s actually 2.28 percent.) You should expect to lose money only 2.5 years out
of every 100. It’s a pretty safe investment.
12. The average return is 5.8 percent, with a standard deviation of 9.2 percent, so Prob( Return <
–3.4 or
Return > 15.0 ) = 1/3, but we are only interested in one tail; Prob( Return < –3.4 ) = 1/6, which is half of 1/3.

95%: 5.8 ± 2σ = 5.8 ± 2(9.2) = –12.6% to 24.2%
99%: 5.8 ± 3σ = 5.8 ± 3(9.2) = –21.8% to 33.4%

13. Expected return = 16.9% ; σ = 33.2%. Doubling your money is a 100% return, so if the return distribution is normal, Z = (100 – 16.9)/33.2 = 2.50 standard deviations; this is in-between two and three standard deviations, so the probability is small, somewhere between .5% and 2.5% (why?). Referring to the nearest Z table, the actual probability is = 0.616%, or less than once every 100 years.

Tripling your money would be Z = (200 – 16.9)/ 33.2 = 5.52 standard deviations; this corresponds to a probability of (much) less than 0.5%, or once every 200 years. (The actual answer is less than once every 1 million years, so don’t hold your breath.)

14. Year Common stocks T-bill return Risk premium
1973 –14.69% 7.29% –21.98%
1974 –26.47% 7.99% –34.46%
1975 37.23% 5.87% 31.36%
1976 23.93% 5.07% 18.86%
1977 –7.16% 5.45% –12.61%
12.84% 31.67% –18.83%

a. Annual risk premium = Common stock return – T-bill return (see table above).
b. Average returns: Common stocks = 12.84 / 5 = 2.57% ; T-bills = 31.67 / 5 = 6.33%;
Risk premium = –18.83 / 5 = –3.77%
c. Common stocks: Var = 1/4[(–.1469 – .0257)2 + (–.2647 – .0257)2 + (.3723 – .0257)2 + (.2393 – .0257)2 + (–.0716 – .0257)2 + (.072337)] = 0.072337
Standard deviation = (0.072337)1/2 = 0.2690 = 26.90%
T-bills: Var = 1/4[(.0729 – .0633)2 + (.0799 – .0633)2 + (.0587 – .0633)2 + (.0507 – .0633)2 + (.0545 – .0633)2] = 0.0001565
Standard deviation = (0.000156)1/2 = 0.0125 = 1.25%
Risk premium: Var = 1/4[(–.2198 – .0377)2 + (–.3446 – .0377)2 + (.3136 – .0377)2 + (.1886 – .0377)2 + (.1261 – .0377)2] = 0.077446
Standard deviation = (0.077446)1/2 = 0.2783 = 27.83%

15. ($197,000 / $1,000)1/48 – 1 = .1164 or 11.64%

16. 5 year estimate = [(5 – 1)/(40 – 1)] × 10.15% + [(40 – 5)/(40 – 1)] × 12.60% = 12.35%
10 year estimate = [(10 – 1)/(40 – 1)] × 10.15% + [(40 – 10)/(40 – 1)] × 12.60% = 12.03%
20 year estimate = [(20 – 1)/(40 – 1)] × 10.15% + [(40 – 20)/(40 – 1)] × 12.60% = 11.41%

17. Small company stocks = ($6,816.41 / $1)1/77 – 1 = .0379 or 3.79%
Long-term government bonds = ($59.70 / $1)1/77 – 1 = .0545 or 5.45%
Treasury bills = ($17.48 / $1)1/77 – 1 = .0379 or 3.79%
Inflation = ($10.09 / $1)1/77 – 1 = .0305 or 3.05%

18. RA = (0.21 + 0.07 – 0.19 + 0.16 + 0.13)/5 = 7.60%
R0 = [(1 + .21)(1+.07)(1 – .19)(1+.16)(1+.12)]1/5 – 1 = 6.57%

19. R1 = ($61.56 – 58.12 + 0.55) / $58.12 = 6.87%
R2 = ($54.32 – 61.56 + 0.60) / $61.56 = –10.79%
\[ R_3 = (\$64.19 - 54.32 + 0.63) / 54.32 = 19.33\% \]
\[ R_4 = (\$74.13 - 64.19 + 0.72) / 64.19 = 16.61\% \]
\[ R_5 = (\$79.32 - 74.13 + 0.81) / 74.13 = 8.09\% \]
\[ R_A = (0.0687 - .1079 + 0.1933 + 0.1661 + 0.0809)/5 = 8.02\% \]
\[ RG = \left[ \left(1 + .0687\right)\left(1 – .1079\right)\left(1 + .1933\right)\left(1 + .1661\right)\left(1 + .0809\right) \right]^{1/5} - 1 = 7.48\% \]

20. Stock A: \[ R_A = (0.11 + 0.11 + 0.11 + 0.11 + 0.11)/5 = 11.00\% \]
\[ Var = \frac{1}{5}\left[(0.11 - 0.11)^2 + (0.11 - 0.11)^2 + (0.11 - 0.11)^2 + (0.11 - 0.11)^2 + (0.11 - 0.11)^2\right] = 0.000000 \]
\[ Standard\ deviation = \sqrt{0.000000} = 0.00\% \]
\[ RG = \left[ \left(1 + .11\right)\left(1 + .11\right)\left(1 + .11\right)\left(1 + .11\right)\right]^{1/5} - 1 = 11.00\% \]

Stock B: \[ R_A = (0.08 + 0.15 + 0.10 + 0.09 + 0.13)/5 = 11.00\% \]
\[ Var = \frac{1}{5}\left[(0.08 - .11)^2 + (.15 - .11)^2 + (.10 - .11)^2 + (.09 - .11)^2 + (.13 - .11)^2\right] = 0.000850 \]
\[ Standard\ deviation = \sqrt{0.000850} = 2.92\% \]
\[ RG = \left[ \left(1 + .08\right)\left(1 + .15\right)\left(1 + .10\right)\left(1 + .09\right)\right]^{1/5} - 1 = 10.97\% \]

Stock C: \[ R_A = (-0.15 + 0.34 + 0.16 + 0.08 + 0.12)/5 = 11.00\% \]
\[ Var = \frac{1}{5}\left[(-.15 - .11)^2 + (.34 - .11)^2 + (.16 - .11)^2 + (.08 - .11)^2 + (.12 - .11)^2\right] = 0.031000 \]
\[ Standard\ deviation = \sqrt{0.031000} = 17.61\% \]
\[ RG = \left[ \left(1 + .15\right)\left(1 + .34\right)\left(1 + .16\right)\left(1 + .08\right)\right]^{1/5} - 1 = 9.83\% \]

The larger the standard deviation, the greater will be the difference between the arithmetic return and geometric return. In fact, for lognormally distributed returns, another formula to find the geometric return is arithmetic return – ½ variance. Therefore, for Stock C, we get .1100 – ½(.031000) = .0945.

The difference in this case is because the return sample is not a true lognormal distribution.

CHAPTER 1 B-5

Spreadsheet Problems

Chapter 2

Buying and Selling Securities

Concept Questions

1. Purchasing on margin means borrowing some of the money used to buy securities. You do it because you desire a larger position than you can afford to pay for, recognizing that using margin is a form of financial leverage. As such, your gains and losses will be magnified. Of course, you hope you only experience the gains.

2. Shorting a security means borrowing it and selling it, with the understanding that at some future date you will buy the security and return it, thereby “covering” the short. You do it because you believe the security’s value will decline, so you hope to sell high now, then buy low later.

3. Margin requirements amount to security deposits. They exist to protect your broker against losses.

4. Asset allocation means choosing among broad categories such as stocks and bonds. Security selection means picking individual assets within a particular category, such as shares of stock in particular companies.

5. They can be. Market timing amounts to active asset allocation, moving money in and out of certain broad classes (such as stocks) in anticipation of future market direction. Of course, market timing and passive asset allocation are not the same.

6. Some benefits from street name registration include:
a. The broker holds the security, so there is no danger of theft or other loss of the security. This is important because a stolen or lost security cannot be easily or cheaply replaced.
b. Any dividends or interest payments are automatically credited, and they are often credited more quickly (and conveniently) than they would be if you received the check in the mail.
c. The broker provides regular account statements showing the value of securities held in the account and any payments received. Also, for tax purposes, the broker will provide all the needed information on a single form at the end of the year, greatly reducing your record-keeping requirements.
d. Street name registration will probably be required for anything other than a straight cash purchase, so, with a margin purchase for example, it will be required.

7. Probably none. The advice you receive is unconditionally not guaranteed. If the recommendation was grossly unsuitable or improper, then arbitration is probably your only possible means of recovery. Of course, you can close your account, or at least what’s left of it.

8. If you buy (go long) 500 shares at $18, you have a total of $9,000 invested. This is the most you can lose because the worst that could happen is that the company could go bankrupt, leaving you with worthless shares. There is no limit to what you can make because there is no maximum value for your shares – they can increase in value without limit.

CHAPTER 2 B-7

9. If the asset is illiquid, it may be difficult to quickly sell it during market declines, or to purchase it during market rallies. Hence, special care should always be given to investment positions in illiquid assets, especially in times of market turmoil.

10. The worst that can happen to a share of stock is for the firm to go bankrupt and the stock to become worthless, so the maximum gain to the short position is $60,000. However, since the stock price can rise without limit, the maximum loss to a short stock position is unlimited.

Solutions to Questions and Problems

NOTE: All end of chapter problems were solved using a spreadsheet. Many problems require multiple steps. Due to space and readability constraints, when these intermediate steps are included in this solutions manual, rounding may appear to have occurred. However, the final answer for each problem is found without rounding during any step in the problem.

Core questions

1. Maximum investment = $13,000 / .50 = $26,000
   Number of shares = $26,000 / $83 per share = 313.25 or 313 shares

2. Margin loan = ($65 × 400) – $15,000 = $11,000
   Margin requirement = $15,000 / ($65 × 400) = 0.5769 or 57.69%

3. Terminal price = $75
   Without margin = ($75 – 65) / $65 = 15.38%
   With margin = {($75 × 400) – (($65 × 400) – $15,000) – $15,000} / $15,000 = 26.67%
   Terminal price = $65
   Without margin = ($65 – 65) / $65 = 0%
   With margin = {($65 × 400) – (($65 × 400) – $15,000) – $15,000} / $15,000 = 0%

4. Initial deposit = 0.40 × ($65 × 400) = $10,400
   Terminal price = $75
Without margin = ($75 – 65) / $65 = 15.38%
With margin = {($75 × 400) – [($65 × 400) – $10,400] – $10,400} / $10,400 = 38.46%
Terminal price = $65
Without margin = ($65 – 65) / $65 = 0%
With margin = {($65 × 400) – [($65 × 400) – $10,400] – $10,400} / $10,400 = 0%
A lower initial margin requirement will make the returns more volatile. In other words, a stock price increase will increase the return, and a stock price decrease will cause a greater loss.

5. Maximum purchase = $13,000 / .60 = $21,666.67
6. Amount borrowed = (900 × $85)(1 – .60) = $30,600
Margin call price = $30,600 / [900 – (.35 × 900)] = $52.31
7. Amount borrowed = (400 × $49)(1 – .50) = $9,800
Margin call price = $9,800 / [400 – (.25 × 400)] = $32.67
Stock price decline = ($32.67 – 49.00) / $49.00 = –33.33%

B-8 SOLUTIONS
8. Proceeds from short sale = 900 × $64 = $57,600
Initial deposit = $57,600(.50) = $28,800
Account value = $57,600 + 28,800 = $86,400
Margin call price = $86,400 / [900 + (.30 × 900)] = $73.85
9. Proceeds from short sale = 1,000($56) = $56,000
Initial deposit = $56,000(.50) = $28,000
Account value = $56,000 + 28,000 = $84,000
Margin call price = $84,000 / [1,000 + (.30 × 1,000)] = $64.62
Account equity = $84,000 – (1,000 × $64.62) = $19,380
10. Pretax return = ($98.00 – 86.00 + 1.40) / $86.00 = 15.58%
Aftertax capital gains = ($98.00 – 86.00)(1 – .20) = $9.60
Aftertax dividend yield = $1.40(1 – .31) = $0.966
Aftertax return = ($9.60 + .966) / $86.00 = 12.29%

Intermediate questions
11. Assets Liabilities and account equity
313 shares $25,979 .00 Margin loan $12,989.50
Account equity 12,989.50
Total $25,979 .00 Total $25,979.00
Stock price = $90
Assets Liabilities and account equity
320 shares $28,170.00 Margin loan $12,989.50
Account equity 15,180.50
Total $28,170.00 Total $28,170.00
Margin = $15,180.50/$28,170 = 53.89
Stock price = $65
Assets Liabilities and account equity
320 shares $20,345.00 Margin loan $12,989.50
Account equity 7,355.50
Total $20,345.00 Total $20,345.00
Margin = $7,355.50/$20,345 = 36.15%
12. 450 shares × $41 per share = $18,450
Initial margin = $10,000/$18,450 = 54.20%
Assets Liabilities and account equity
450 shares $18,450 Margin loan $8,450
Account equity 10,000
Total $18,450 Total $18,450
CHAPTER 2 B-9

13. Total purchase = 400 shares × $72 = $28,800
Margin loan = $28,800 – 15,000 = $13,800
Margin call price = $13,800 / [400 – (.30 × 400)] = $49.29
To meet a margin call, you can deposit additional cash into your trading account, liquidate shares until your margin requirement is met, or deposit additional marketable securities against your account as collateral.

14. Interest on loan = $13,800(1.065) – 13,800 = $897
   a. Proceeds from sale = 400($96) = $38,400
      Dollar return = $38,400 – 15,000 – 13,800 – 897 = $8,703
      Rate of return = $8,703 / $15,000 = 58.02%
      Without margin, rate of return = ($96 – 72)/$72 = 33.33%
   b. Proceeds from sale = 400($72) = $28,800
      Dollar return = $28,800 – 15,000 – 13,800 – 897 = $8,703
      Rate of return = $8,703 / $15,000 = 58.02%
      Without margin, rate of return = 58.02%
   c. Proceeds from sale = 400($64) = $25,600
      Dollar return = $25,600 – 15,000 – 13,800 – 897 = $8,703
      Rate of return = $8,703 / $15,000 = 58.02%
      Without margin, rate of return = 58.02%

15. Amount borrowed = (1,000 × $46)(1 – .50) = $23,000
   Interest = $23,000 × .0870 = $2,001
   Proceeds from sale = 1,000 × $53 = $53,000
   Dollar return = $53,000 – 23,000 – 2,001 = $30,000
   Rate of return = $30,000 / $23,000 = 130.43%

16. Total purchase = 800 × $32 = $25,600
   Loan = $25,600 – 15,000 = $10,600
   Interest = $10,600 × .083 = $879.80
   Proceeds from sale = 800 × $37 = $29,600
   Dividends = 800 × $.64 = $512
   Dollar return = $29,600 + 512 – 15,000 – 10,600 – 879.80 = $4,999
   Rate of return = $4,999 / $23,000 = 21.73%

17. $45,000 × (1.087)6/12 – 45,000 = $1,916.68
18. $32,000 × (1.069)2/12 – 32,000 = $357.85
19. (1 + .15)12/7 – 1 = 27.07%
20. (1 + .15)12/5 – 1 = 39.85%
   All else the same, the shorter the holding period, the larger the EAR.

21. Holding period return = ($41 – 48 + .15) / $48 = −14.27%
    EAR = (1 – .1427)12/5 − 1 = −30.90%

B-10 SOLUTIONS

22. Initial purchase = 450 × $41 = $18,450
   Amount borrowed = $18,450 – 10,000 = $8,450
   Interest on loan = $8,450(1 + .0725)1/2 − 8,450 = $300.95
   Dividends received = $450($.25) = $112.50
   Proceeds from stock sale = 450($46) = $20,700
   Dollar return = $20,700 + 112.50 – 10,000 – 8,450 – 300.95 = $2,061.55
   Rate of return = $2,061.55 / $10,000 = 20.62 per six months
   Effective annual return = (1 + .2062)2 – 1 = 45.48%

23. Proceeds from sale = 2,000 × $54 = $108,000
   Initial margin = $108,000 × 1.00 = $108,000
   Assets Liabilities and account equity
Proceeds from sale $108,000 Short position $108,000
Initial margin deposit 108,000 Account equity 108,000
Total $216,000 Total $216,000
24. Proceeds from sale = 2,000 × $54 = $108,000
Initial margin = $108,000 × .75 = $81,000
Assets Liabilities and account equity
Proceeds from sale $108,000 Short position $108,000
Initial margin deposit 81,000 Account equity 81,000
Total $189,000 Total $189,000
25. Proceeds from short sale = 1,200($86) = $103,200
Initial margin deposit = $103,200(.50) = $51,600
Total assets = Total liabilities and equity = $103,200 + 51,600 = $154,800
Cost of covering short = 1,200($73) = $87,600
Account equity = $154,800 – 87,600 = $67,200
Cost of covering dividends = 1,200($1.20) = $1,440
Dollar profit = $67,200 – 51,600 – 1,440 = $14,160
Rate of return = $14,160 / $51,600 = 27.44%
CHAPTER 2 B-11
26. Proceeds from sale = 1,600 × $83 = $132,800
Initial margin = $132,800 × .50 = $66,400
Initial Balance Sheet
Assets Liabilities and account equity
Proceeds from sale $132,800 Short position $132,800
Initial margin deposit 66,400 Account equity 66,400
Total $199,200 Total $199,200
Stock price = $73
Assets Liabilities and account equity
Proceeds from sale $132,800 Short position $116,800
Initial margin deposit 66,400 Account equity 82,400
Total $199,200 Total $199,200
Margin = $82,400 / $116,800 = 70.55%
Four-month return = ($82,400 – 66,400) / $66,400 = 24.10%
Effective annual return = (1 + .2410)12/5 – 1 = 67.89%
Stock price = $93
Assets Liabilities and account equity
Proceeds from sale $132,800 Short position $148,800
Initial margin deposit 66,400 Account equity 50,400
Total $199,200 Total $199,200
Margin = $50,400 / $148,800 = 33.87%
Four-month return = ($50,400 – 66,400) / $66,400 = –24.10%
Effective annual return = (1 – .2410)12/5 – 1 = –48.40%
Chapter 3
Overview of Security Types
Concept Questions
1. The two distinguishing characteristics are: (1) all money market instruments are debt instruments (i.e., IOUs), and (2) all have less than 12 months to maturity when originally issued.
2. Preferred stockholders have a dividend preference and a liquidation preference. The dividend preference requires that preferred stockholders be paid before common stockholders. The liquidation
preference means that, in the event of liquidation, the preferred stockholders will receive a fixed face value per share before the common stockholders receive anything.

3. The PE ratio is the price per share divided by annual earnings per share (EPS). EPS is the sum of the most recent four quarters’ earnings per share.

4. The current yield on a bond is very similar in concept to the dividend yield on common and preferred stock.

5. Volume in stocks is quoted in round lots (multiples of 100). Volume in corporate bonds is the actual number of bonds. Volume in options is reported in contracts; each contract represents the right to buy or sell 100 shares. Volume in futures contracts is reported in contracts, where each contract represents a fixed amount of the underlying asset.

6. You make or lose money on a futures contract when the futures price changes, not the current price for immediate delivery (although the two are closely related).

7. Open interest is the number of outstanding contracts. Since most contract positions will be closed before maturity, it will usually shrink as maturity approaches.

8. A futures contract is a contract to buy or sell an asset at some point in the future. Both parties in the contract are legally obligated to fulfill their side of the contract. In an option contract, the buyer has the right, but not the obligation, to buy (call) or sell (put) the asset. This option is not available to the buyer of a futures contract. The seller of a futures or options contract have the same responsibility to deliver the underlying asset. The difference is the seller of a future knows she must deliver the asset, while the seller of an option contract is uncertain about delivery since delivery is at the option purchasers discretion.

9. A real asset is a tangible asset such as a land, buildings, precious metals, knowledge, etc. A financial asset is a legal claim on a real asset. The two basic types of financial assets are primary assets and derivative asset. A primary asset is a direct claim on a real asset. A derivative asset is basically a claim (or potential claim) in a primary asset or even another derivative asset.

CHAPTER 3 B-13

10. Initially, it might seem that the put and the call would have the same price, but this is not correct. If the strike price is exactly equal to the stock price, the call option must be worth more. Intuitively, there are two reasons. First, there is no limit to what you can make on the call, but your potential gain on the put is limited to $100 per share. Second, we generally expect that the stock price will increase, so the odds are greater that the call option will be worth something at maturity.

Core Questions

1. Dividend yield = .013 = .30 / P0 thus P0 = $.30 / .013 = $23.08
Stock closed up $.26, so yesterday’s closing price = $23.08 – $.26 = $22.82
2,855 round lots of stock were traded.

2. PE = 16; EPS = P0 / 16 = $23.08 / 16 = $1.44
EPS = NI / shares; so NI = $1.44(25,000,000) = $36,057,692
3. Dividend yield is 3.8%, so annualized dividend is .038($84.12) = $3.20. This is just four times the last quarterly dividend, which is thus $3.20/4 = $.80/share.

4. PE = 21; EPS = P0/21 = $84.12/21 = $4.01

5. The total par value of purchase = 4,000($1,000) = $400,000
Next payment = ($400,000 × .084)/2 = $16,800
Payment at maturity = $16,800 + 400,000 = $416,800
Remember, the coupon payment is based on the par value of the bond, not the price.

6. Contract to buy = 700/50 = 14
Purchase price = 14 × 50 × $860 = $602,000
P = $895: Gain = ($895 – 860) × 14 × 50 = $24,500
P = $840: Gain = ($840 – 860) × 14 × 50 = –$14,000

7. Cost of contracts = $3.20 × 10 × 100 = $3,200
If the stock price is $78.14, the value is: ($78.14 – 70) × 10 × 100 = $8,140
Dollar return = $8,140 – 3,200 = $4,940
If the stock price is $67.56, the call is worthless, so the dollar return is –$3,200.

8. The stock is down 1.50%, so the price was $51.80/(1 – .015) = $52.59

9. Price = (126.326/100)$1,000 = $1,263.26
Current yield = Annual coupon payment/Price = $77/$1,263.26 = 6.10%
YTM of comparable Treasury = 5.768% – 1.41% = 4.358%

10. Next payment = 25(.0770/2)($1,000) = $962.50

Intermediate Questions

11. Open interest in the March contract is 64,967 contracts.
Since the standard contract size is 50,000 lbs., sell 400,000/50,000 = 8 contracts.
You’ll deliver 8(50,000) = 400,000 pounds of cotton and receive 8(50,000)($0.4864) = $194,560.

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12. Trading volume yesterday in all open contracts was approximately 4,814.
The day before yesterday, 5,356 contracts were traded.

13. Initial value of position = 15(50,000)($5.345) = $400,875
Final value of position = 15(50,000)($5.794) = $434,550
Dollar profit = $434,550 – 400,875 = $33,675

14. Shares of GNR stock sell for $75.25. The right to sell shares is a put option on the stock; the July put with a strike price of $75 closed at $1.65. Since each stock option contract is for 100 shares of stock, you’re looking at 2,000/100 = 20 option contracts. Thus, the cost of purchasing this right is 20($1.65)(100) = $3,300

15. The cheapest put contract (that traded on this particular day) is the June 65. The most expensive option is the June 85. The first option is cheap because it has little time left to maturity and is not likely to be worth anything since the strike price is below the current market price. The latter option is expensive because it has a relatively long time to maturity and the strike price is above the current stock price.

Return on investment per 3 months = ($3.15 – 1.65)/$1.65 = 90.91%
Annualized return on investment = (1 + .9091)12/3 – 1 = 1228.83%
Case 2: The option finishes worthless, so payoff = $0. Dollar return = –$3,300
Return on investment = –100% over all time periods.
17. The very first call option listed has a strike price of 10 and a quoted premium of $5.50. This can’t be right because you could buy an option for $5.50 and immediately exercise it for another $10. You can then sell the stock for its current price of $20.25, earning a large, riskless profit. To prevent this kind of easy money, the option premium must be at least $10.25. Similarly, the September 30 put is quoted at $8.75. You could buy the put and immediately exercise it. The put premium must be at least $9.75.

18. If you buy the stock, your $20,000 will purchase five round lots, meaning 500 shares. A call contract costs $400, so you can buy 50 of them. If, in six months, MMEE is selling for $46, your stock will be worth 500 shares × $46 = $23,000. Your dollar gain will be $23,000 less the $20,000 you invested, or $3,000. Since you invested $20,000, your return for the six-month period is $3,000/$20,000 = 15%. To annualize your return, we need to compute the effective annual return, recognizing that there are two six-month periods in a year.

1 + EAR = 1.15² = 1.3225

EAR = .3225 or 32.25%

Your annualized return on the stock is 32.25%.

If MMEE is selling for $35 per share, your loss on the stock investment is –12.50%, which annualizes as follows:

1 + EAR = .8750² = .7656

EAR = –.2344 or –23.44%

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At the $46 price, your call options are worth $46 – 40 = $6 each, but now you control 5,000 shares (50 contracts), so your options are worth 5,000 shares × $6 = $30,000 total. You invested $20,000, so your dollar return is $30,000 – 20,000 = $10,000, and your percentage return is $10,000/$20,000 = 50%, compared to 32.25 on the stock investment. This annualizes to:

1 + EAR = 1.50² = 2.25

EAR = 1.25 or 125%

However, if MMEE is selling for $35 when your options mature, then you lose everything ($20,000 investment), and your return is –100%.

19. You only get the dividend if you own the stock. The dividend would increase the return on your stock investment by the amount of the dividend yield, $.50/$40 = .0125, or 1.25%, but it would have no effect on your option investment. This question illustrates that an important difference between owning the stock and the option is that you only get the dividend if you own the stock.

20. At the $36.40 stock price, your put options are worth $40 – 36.40 = $3.60 each. The premium was $2.50, so you bought 80 contracts, meaning you control 8,000 shares. Your options are worth 8,000 shares × $3.60 = $28,800 total. You invested $20,000, so your dollar return is $28,800 – 20,000 = $8,800, and your percentage return is $8,800/$20,000 = 44%. This annualizes to:

1 + EAR = 1.44² = 2.0736
Chapter 4
Mutual Funds

Concept Questions
1. Mutual funds are owned by fund shareholders. A fund is run by the fund manager, who is hired by the fund’s directors. The fund’s directors are elected by the shareholders.
2. A rational investor might pay a load because he or she desires a particular type of fund or fund manager for which a no-load alternative does not exist. More generally, some investors feel you get what you pay for and are willing to pay more. Whether they are correct or not is a matter of some debate. Other investors simply are not aware of the full range of alternatives.
3. The NAV of a money market mutual fund is never supposed to change; it is supposed to stay at a constant $1. It never rises; only in very rare instances does it fall. Maintaining a constant NAV is possible by simply increasing the number of shares as needed such that the number of shares is always equal to the total dollar value of the fund.
4. A money market deposit account is essentially a bank savings account. A money market mutual fund is a true mutual fund. A bank deposit is insured by the FDIC, so it is safer, at least up to the maximum insured amount.
5. If your investment horizon is only one year, you probably should not invest in the fund. In this case, the fund return has to be greater than five percent just to make back your original investment. Over a twenty-year horizon, you have more time to make up the initial load. The longer the investment horizon, the better chance you have of regaining the amount paid in a front-end load.
6. In an up market, the cash balance will reduce the overall return since the fund is partly invested in assets with a lower return. In a down market, a cash balance should help reduce the negative returns from stocks or other instruments. An open-end fund typically keeps a cash balance to meet shareholder redemptions. A closed-end fund does not have shareholder redemptions so very little cash, if any, is kept in the portfolio.
7. 12b-1 fees are designed to pay for marketing and distribution costs. It does not really make sense that a closed-end fund charges 12b-1 fees because there is no need to market the fund once it has been sold at the IPO and there are no distributions necessary for the fund since the shares are sold on the secondary market.
8. You should probably buy an open-end fund because the fund stands ready to buy back shares at NAV. With a closed-end fund another buyer must make the purchase, so it may be more difficult to sell at NAV. We should note that an open-end fund may have the right to delay redemption if it so chooses.
9. Funds that accumulate a long record of poor performance tend to not attract investors. They are often simply merged into other funds. This is a type of survivor bias, meaning that a mutual fund family’s
typical long-term track record may look pretty good, but only because the poor performing funds did
not survive. In fact, several hundred funds disappear each year.

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10. It doesn’t matter! For example, suppose we have a fund with a NAV of $100, a two percent fee, and a
10 percent annual return. If the fee is charged up front, we will have $98 invested, so at the end of the
year, it will grow to $107.80. If the fee is charged at the end of the year, the initial investment of
$100 will grow to $110. When the two percent fee is taken out, we will be left with $107.80, the same
amount we would have if the fee was charged up front.

Core Questions

NOTE: All end of chapter problems were solved using a spreadsheet. Many problems require
multiple
steps. Due to space and readability constraints, when these intermediate steps are included in this
solutions manual, rounding may appear to have occurred. However, the final answer for each
problem is
found without rounding during any step in the problem.

1. NAV = $4,500,000,000 / 130,000,000 = $34.62
2. Load = ($36.10 – 34.62)/$36.10 = 4.11%
3. NAV = $48.65(1 – .015) = $47.92; Market value of assets = $47.92(13,400,000) =
$642,128,000
4. Initial shares = 15,000. Final shares = 15,000(1.046) = 15,690, and final NAV = $1 because
this is a
money market fund.

5. Total assets = (4,000 × $68) + (9,000 × $32) + (6,500 × $44) + (8,400 × $56) = $1,316,400
NAV = $1,316,400 / 50,000 = $26.33
6. NAV = ($1,316,400 – 75,000) / 50,000 = $24.83
7. Offering price = $24.83 / (1 – .05) = $26.14
8. $68,000,000 / $120,000,000 = 56.67%
9. NAV = ($350,000,000 – 800,000) / 20,000,000 = $17.46
($15.27 – 17.46) / $17.46 = –12.54%
10. ($43.51 – 41.86 + 0.34 + 1.25) / $41.86 = 7.74%

Intermediate

11. Turnover = X/$2,700,000,000 = .47; X = $1,269,000,000. This is less than the $1.45 billion in
sales,
so this is the number used in the calculation of turnover in this case.
12. Management fee = .0085($2,700,000,000) = $22,950,000
Miscellaneous and administrative expenses = (.0125 – .0085)$2,700,000,000 = $10,800,000
13. Initial NAV = $41.20(1 – .05) = $39.14
Final NAV = $39.14[1 + (.12 – .0165)] = $43.19
Sale proceeds per share = $43.19(1 – .02) = $42.33
Total return = ($42.33 – 41.20) / $41.20 = 2.74%
You earned 2.74% even though the fund’s investments grew by 12%! The various fees and loads
sharply reduced your return.

B-18 SOLUTIONS

Note, there is another interpretation of the solution. To calculate the final NAV including fees, we
would first find the final NAV excluding fees with a 12 percent return, which would be:
NAV excluding fees = $39.14(1 + .12) = $43.84
Now, we can find the final NAV after the fees, which would be:
Final NAV = $43.84(1 – .0165) = $43.11
Notice this answer is $0.08 different than our original calculation. The reason is the assumption behind the fee withdrawal. The second calculation assumes the fees are withdrawn entirely at the end of the year, which is generally not true. Generally, fees are withdrawn periodically throughout the year, often quarterly. The actual relationship between the return on the underlying assets, the fees charged, and the actual return earned is the same as the Fisher equation, which shows the relationship between the inflation, the nominal interest rate, and the real interest rate. In this case, we can write the relationship as:

\[(1 + \text{Return on underlying assets}) = (1 + \text{Fees})(1 + \text{Return earned})\]

As with the Fisher equation, effective annual rates must be used. So, we would need to know the periodic fee withdrawal and the number of fee assessments during the year to find the exact final NAV. Our first calculation is analogous to the approximation of the Fisher equation, hence it is the method of calculation we will use going forward, that is:

\[\text{Return earned} = \text{Return on underlying assets} – \text{Fees}\]

Assuming a small fee (which we hope the mutual fund would have), the answer will be closest to the actual value without undue calculations.

14. Initial NAV = $41.20; Final NAV = $41.20[1 + (.12 – .0095)] = $45.75 = Sale proceeds
Total return = ($45.75 – 41.20)/41.20 = 11.05%

15. The OTC Portfolio (“OTC”) is classified as XG, which is multi-cap growth. Its one-year return is –26.9%, which is good for a B rating. This places the fund in the top 20 to 40 percent.

16. The highest load is a substantial 8.24 percent.

17. Of the funds listed, the one with the lowest costs (in terms of expense ratios) is the “Four-in-One” Fund. That’s a little misleading, however, because this fund actually is a “fund of funds,” meaning that it invests in other mutual funds (in this case, four of them). The highest cost funds tend to be more internationally oriented.

18. This fund has a 3% load and a NAV of $7.16. The offer price, which is what you would pay, is $7.16/(1 – .03) = $7.38, so 1,000 shares would cost $7,380.

19. Since we are concerned with the annual return, the initial dollar investment is irrelevant, so we will calculate the return based on a one dollar investment.

1 year: \([0.95(1 + .12)]^{\frac{1}{1}} – 1 = 6.40\%
2 years: \([0.95(1 + .12)^2]\)^{\frac{1}{2}} – 1 = 9.16\%
5 years: \([0.95(1 + .12)^5]\)^{\frac{1}{5}} – 1 = 10.86\%
10 years: \([0.95(1 + .12)^{10}]\)^{\frac{1}{10}} – 1 = 11.43\%

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20 years: \([0.95(1 + .12)^{20}]\)^{\frac{1}{20}} – 1 = 11.71\%
50 years: \([0.95(1 + .12)^{50}]\)^{\frac{1}{50}} – 1 = 11.89\%

20. After 3 years: (For every dollar invested)
Class A: $0.9425(1 + .11 – .0023 – .0073)^3 = $1.25584
Class B: \([1.00(1 + .11 – .01 – .0073)^3](1 – .02) = $1.27858
After 20 years:
Class A: $0.9425(1 + .11 – .0023 – .0073)^{20} = $6.38694
Class B: $1.00(1 + .11 − .01 − .0073)_3 = $5.88869

21. $(1 + .04 − .002)^2 = (1 − .05)(1 + R − .0140)^2$; $1.07744 = 0.95(1 + R − .0140)^2$; $R = 7.90\%$
$(1 + .04 − .002)^{10} = (1 − .05)(1 + R − .0140)^{10}$; $1.45202 = 0.95(1 + R − .0140)^{10}$; $R = 5.73\%$

22. National municipal fund: after-tax yield = $0.039(1 − .08) = 3.59\%$
Taxable fund: after-tax yield = $0.061(1 − .35 − .08) = 3.48\%$
New Jersey municipal fund: after-tax yield = 3.60\%
Choose the New Jersey fund.

23. Municipal fund: after-tax yield = 3.90\%
Taxable fund: after-tax yield = $0.061(1 − .35) = 3.97\%$
New Jersey municipal fund: after-tax yield = 3.60\%
Choose the taxable fund.

24. $(18.43 − \text{NAV})/\text{NAV} = −.128$; \text{NAV} = $21.14$
Shares outstanding = $360M/21.14 = 17,029,328$
For closed-end funds, the total shares outstanding are fixed, just as with common stock (assuming no net repurchases by the fund or new share issues to the public).

25. \text{NAV at IPO} = $25(1 − .08) = $23.00$
$(P − $23.00)/$23.00 = −.10$ so $P = $20.70$
The value of your investment is $5,000($20.70) = $103,500, a loss of $21,500 in one day.