CHAPTER 2
FINANCIAL MARKETS AND INSTRUMENTS

1. Money market securities are called "cash equivalents" because of their great liquidity. The prices of money market securities are very stable, and they can be converted to cash (i.e., sold) on very short notice and with very low transaction costs.

2. a. $r_{BEY} = \frac{10000 - P}{P} \times \frac{365}{n}$

$= \frac{10000 - 9600}{9600} \frac{365}{182} = .083565$, or 8.36%

b. One reason is that the discount yield is computed by dividing the dollar discount from par by the par value, \$10,000, rather than by the bill's price, \$9,600. A second reason is that the discount yield is annualized by a 360-day rather than a 365-day year.

3. $P = 1{,}000\ [1 - r_{BD}\ (n/360)]$ where r_{BD} is the discount yield.

$P_{ask} = 1{,}000[1 - .0681(60/360)] = \$988.65$

$P_{bid} = 1{,}000\ [1 - .0690(60/360)] = \$988.50$

4. $r_{BEY} = \frac{1{,}000 - P}{P} \times \frac{365}{n}$

$= \frac{1{,}000 - 988.65}{988.65} \times \frac{365}{60} = 6.98\%,$

which exceeds the discount yield, $r_{BD} = 6.81\%$.

To obtain the effective annual yield, r_{EAY}, note that the 60-day growth factor for invested funds is $\frac{1{,}000}{988.65} = 1.01148$. Annualizing this growth rate results in

$1 + r_{EAY} = \left(\frac{1{,}000}{988.65}\right)^{365/60} = 1.0719$ which implies that $r_{EAY} = 7.19\%$.

5. According to equation 2.2:

$P = 10{,}000/[1 + r_{BEY} \times (n/365)]$

$P = 10{,}000/[1 + .05 \times (91/365)] = \$\ 9{,}875.34$

6. a. i. $1 + r = (10{,}000/9{,}764)^4 = 1.1002$

$r = 10.02\%$

ii. $1 + r = (10{,}000/9{,}539)^2 = 1.0990$

$r = 9.90\%$

The three-month bill offers a higher effective annual yield.

b. i. $r_{BD} = \frac{10000 - 9764}{10000} \times \frac{12}{3} = .0944 = 9.44\%$

ii. $r_{BD} = \frac{10000 - 9539}{10000} \times \frac{12}{6} = .0922 = 9.22\%$

7. a. Price $= \$1{,}000 \times \left[1 - .03 \times \frac{90}{360}\right] = \$992.5$

b. 90-day return $= \frac{1{,}000 - 992.5}{992.5} = .007557 = .7557\%$

c. $r_{BEY} = .7557\% \times \frac{365}{90} = 3.06\%$

d. Effective annual yield $= (1.007557)^{365/90} - 1 = .0310 = 3.10\%$

8. The bill has a maturity of one half-year, and an annualized discount of 9.18%. Therefore, its actual percentage discount from par value is 9.18% × 1/2 = 4.59%. The bill will sell for $100,000 × (1– .0459) = $95,410.

9. The total before-tax income is $4. Since the dividend income is fully excluded from taxable income, the after-tax income is also $4, for a rate of return of 10%.

10. a. The index at $t = 0$ is (60 + 80 + 20)/3 = 53.33. At $t = 1$, it is (70 + 70 + 25)/3 = 55, for a rate of return of 3.13%.

b.

Stock	***Q***	P_0	**Market Value**	P_1	**Market Value**
A	200	60	12,000	70	14,000
B	500	80	40,000	70	35,000
C	600	20	12,000	25	15,000

The index at $t = 0$ is (12,000 + 40,000 + 12,000)/100 = 640. At $t = 1$, it is also 640, so the rate of return is zero.

c.

	Before Splits		**After Splits**		
Stock	P_0	***Q***	P_0	***Q***	P_1
A	60	200	30	400	35
B	80	500	20	2,000	17.5
C	20	600	20	600	25

After the splits the index has to remain unchanged so the divisor (which initially was 3) has to be reset. The sum of the three prices after the split is 70, while the index value before splits was 53.33. Therefore $70/d = 53.33$ and the new divisor must be 1.3125. The index at $t = 1$ is (35 + 17.5 + 25)/1.3125 = 59.05 for a return of 10.71%.

d. The total market value of A and B as well as that of the market remain unchanged after the two splits so that the return on the value-weighted index is not affected by the splits (and it is zero).

11. a. The index at $t = 0$ is $(90 + 50 + 100)/3 = 80$. At $t = 1$, it is $250/3 = 83.333$, for a rate of return of 4.17%.

b. In the absence of a split, stock C would sell for 110, and the index would be $250/3 = 83.333$. After the split, stock C sells at 55. Therefore, we need to set the divisor d such that $83.333 = (95 + 45 + 55)/d$, meaning that $d = 2.34$.

c. The return is zero. The index remains unchanged, as it should, since the return on each stock separately equals zero.

12. a. Total market value at $t = 0$ is $(9{,}000 + 10{,}000 + 20{,}000) = 39{,}000$. Market value at $t = 1$ is $(9{,}500 + 9{,}000 + 22{,}000) = 40{,}500$. Rate of return $= 40{,}500/39{,}000 - 1 = 3.85\%$.

b. The return on each stock is as follows:

$r_A = 95/90 - 1 = .0556$

$r_B = 45/50 - 1 = -.10$

$r_C = 110/100 - 1 = .10$

The equally weighted average is $.0185 = 1.85\%$

13. a. The higher coupon bond.

b. The call with the lower exercise price.

c. The put on the lower priced stock.

d. The bill with the lower yield.

14. Preferred stock is like long-term debt in that it typically promises a fixed payment each year. In this way, it is a perpetuity. Preferred stock is also like long-term debt in that it does not give the holder voting rights in the firm.

Preferred stock is like equity in that the firm is under no contractual obligation to make the preferred stock dividend payments. Failure to make payments does not set off corporate bankruptcy. With respect to the priority of claims to the assets of the firm in the event of corporate bankruptcy, preferred stock has a higher priority than common equity but a lower priority than bonds.

15.

	Value of call at expiration	–	Initial cost	=	Profit
a.	\$0		\$4		\$–4
b.	\$0		\$4		\$–4
c.	\$0		\$4		\$–4
d.	\$5		\$4		\$1
e.	\$10		\$4		\$6

16. There is always a chance that the option will be in the money at some point prior to expiration. Investors will pay something for this chance of a positive payoff.

17. A call option conveys the *right* to buy the underlying asset at the exercise price. A long position in a futures contract carries an *obligation* to buy the underlying asset at the futures price.

18. A put option conveys the *right* to sell the underlying asset at the exercise price. A short position in a futures contract carries an *obligation* to buy the underlying asset at the futures price.

19. Individual response. However, on the day that we tried this experiment, 18 of the 25 stocks met this criterion, leading us to conclude that returns on stock investments can be quite volatile.

20. The spread will widen. Deterioration of the economy increases credit risk, that is, the likelihood of default. Investors will demand a greater premium on debt securities subject to default risk.

21. a. Because the stock price exceeds the exercise price, you will choose to exercise. The payoff on the option will be \$28 – \$24 = \$4. The option originally cost \$5.90, so the loss is \$5.90 – \$4.00 = \$1.90. There is a loss after considering options cost, so you will not exercise. Rate of return will be –\$1.90/\$24 = –7.92 percent.

b. If the exercise price were \$25, and the stock price \$24, you would not exercise. The loss on the call would be the initial cost, which was \$4.90. Rate of return will be –\$4.90/\$25 = –19.60 percent.

c. If the put has an exercise price of \$24, you would not exercise for any stock price of \$24 or above. The loss on the put would be the initial cost, which was \$.09. With a

share price of $22, the put would be exercised for a gain of $2 ($24 – $22) which would give a profit of $1.91 ($2 gain – $.09 cost). Rate of return will be $1.91/$22 = 8.68 percent.

22. a. Aecon closed at $11.22.

    b. Assuming that you buy at the closing price, you could buy $5,000/$11.22 = 445.63 shares, which we will take to be 446.

    c. The dividend is 2.9% of $11.22, which is probably an annual amount of $.33; your dividend income would be 446 × $ .33 = $145.12 annually.

    d. The price-to-earnings ratio is 8.8, and price is $11.22 Therefore,

    Earnings (EPS) = $11.22/8.8 $\Rightarrow$ EPS = $1.28

23. a. You bought the contract when the futures price was 713 (see Figure 2.9). The contract closes at a price of $720, which is $7 higher than the original futures price. Therefore, you will incur a gain of $7 × 200 = $1,400.

    b. Open interest on the index is 144,856 contracts.

24. d

25. a. Writing a call entails unlimited potential losses as the stock price rises.