19.7: In 1980 a certain assistant professor of finance bought 12 initial public offerings of common stock. He held each of these for approximately one month and then sold them. The investment rule he followed was to submit a purchase order for every firm-commitment initial public offering of oil- and gas-exploration companies. There were 22 such offerings, and he submitted a purchase order for approximately $1,000 of stock for each one. With 10 of these, no shares were allocated to this assistant professor. With five of the 12 offerings that were purchased, fewer than the requested number of shares were allocated. The year 1980 was very good for oil- and gas-exploration company owners. For the 22 stocks that went public, the stock was selling on average for 80 percent above the offering price within a month. Yet, this assistant professor looked at his performance record and found the $8,400 invested in 12 companies had grown to only $10,100, a return of only about 20 percent. (Commissions were negligible.) Did he have bad luck, or should he have expected to do worse than the average initial-public-offering investor? Explain.

19.14 Summit Corp.’s stock is currently selling at $13 per share. There are 1 million shares outstanding. The firm is planning to raise $2 million to finance a new project. What is the ex-right stock price, the value of a right, and the appropriate subscription prices, if
a. Two shares of outstanding stock are entitled to purchase one additional share of the new issue.
b. Four shares of outstanding stock are entitled to purchase one additional share of the new issue.
c. How does the stockholders’ wealth change from a to b?

20.8 Illinois Industries has decided to borrow money by issuing perpetual bonds. The face value of the bonds will be $1,000. The coupon will be 8 percent, payable annually. The one-year interest rate is 8 percent. It is known that next year there is a 65-percent chance that interest rates will decline to 6 percent, and that there is a
35-percent chance that they will rise to 9 percent.

a. What will the market value of these bonds be if they are noncallable?

b. If the company instead decides to make the bonds callable, what coupon will be demanded by the bondholders for the bonds to sell at par? Assume that the bonds can be called in one year (i.e., the call date is one year from now) and that the call premium is equal to the annual coupon.

c. What will be the value of the call provision to Illinois Industries?

20.12 Margret Kimberly, CFO of Charles River Associates, is considering whether or not to refinance the two currently outstanding corporate bonds of the firm. The first one is an 8-percent perpetual bond with a $1,000 face value with $75 million outstanding. The second one is a 9-percent perpetual bond with the same face value with $87.5 million outstanding. The call premiums for the two bonds are 8.5 percent and 9.5 percent of the face value, respectively. The transaction costs of the refundings are $10 million and $12 million, respectively. The current interest rates for the two bonds are 7 percent and 7.25 percent, respectively. Which bond should Ms. Kimberly recommend be refinanced? What is the NPV of the refunding?

22.14 Gimpellian Software, Inc., is a non-dividend-paying common stock that currently trades for $135 per share. Kevin is interested in purchasing a European call option with a strike price of $140 and one year until expiration. Much to his dismay, he discovers that call options are not traded on Gimpellian’s stock. In fact, the only options traded on Gimpellian’s stock are put options with a strike price of $140 and one year until expiration. These put options are currently trading for $2. The risk-free rate is 25% per annum.

a. Compare the market price of the put with the payoff from the immediate exercise of a put option with a strike price of $140. Is this an arbitrage opportunity? Why or why not?

b. Is there a way for Kevin to obtain a synthetic call option with a strike price of $140 and one year until expiration? If there is, what is it? How much would this synthetic call option cost?

c. Draw the payoff diagram at expiration of Kevin’s synthetic call position with respect to the stock price.

22.16 Rob wishes to buy a European put option on Biolabs, Inc., a non-dividend-paying common stock, with a strike price of $40 and six months until expiration. Biolab’s common stock is currently selling for $30 per share, and Rob expects that the stock price will either rise to $60 or fall to $15 in six months. Rob can borrow and lend at the risk-free interest rates of 21 percent per annum (effective annual yield).

a. How much should Rob expect to pay for his desired put option today?

b. If no options currently trade on Biolab’s stock, is there a way for Rob to create a synthetic put option with identical payoffs to the put option described above? If there is, how would he do it?
c. How much does the synthetic put option cost? Is this greater than, less than, or equal to what the actual put option costs? Does this make sense?

22.20 John Goodfriend is interested in purchasing a European call option on Mozer, Inc., a non-dividend-paying common stock, with a strike price of $25 and six months until expiration. Mozer’s stock is currently trading at $15 per share, and the annual variance of its continuously compounded returns is 0.25. Treasury bills that mature in six months yield a continuously compounded interest rate of 8 percent per annum. Use the Black-Scholes model to calculate the price of the call option that John is interested in buying.

23.4 Jet Black is an international conglomerate with a petroleum division and is currently competing in an auction to win the right to drill for crude oil on a large piece of land in one year. The current market price of crude oil is $25 per barrel, and the land contains 60,000 barrels of oil. If found, excavating the oil would cost the firm $1.75 million. Treasury bills that mature in one year yield a continuously compounded interest rate of 10 percent per annum, and the annual variance of the continuously compounded returns on the price of crude oil is 0.36. Use the Black-Scholes model to calculate the maximum bid that Jet Black should be willing to make at the auction.

24.9 Superior Clamps, Inc., has a capital structure consisting of 4 million shares of common stock and 500,000 warrants. Each warrant gives its owner the right to purchase one share of newly issued common stock for an exercise price of $20. The warrants are European and will expire one year form today. The market value of Superior’s assets is $88 million. The annual variance of the continuously compounded returns on the firm’s assets is 0.04. Treasury bills that mature in one year yield a continuously compounded interest rate of 7 percent per annum. Superior pays no dividends. Use the Black-Scholes model to determine the value of a single warrant.

24.17 Consider a 30-year callable, convertible bond issued by Firm A. The bond has a face value of $1,000, makes 6 percent annual coupon payments, and has a conversion price of $125. Firm A’s stock is currently selling for $35 per share. The owner of the bond will be forced to convert if the bond’s conversion value is ever greater than or equal to $1,100. The required return on an otherwise identical nonconvertible bond is 12 percent per annum.
   a. What is the straight value of the convertible bond?
   b. What is its conversion value?
   c. If firm A’s stock price were to grow by 15 percent per year forever, how long would it take for the bond’s conversion value to exceed $1,100?

29.7 Cholern Electric Company (CEC) is a public utility that provides electricity to the central colorado area. Recent events at its Mile-High Nuclear Station have been discouraging. Several shareholders have expressed concern over last year’s financial
Recently, a wealthy group of individuals has offered to purchase one-half of CEC’s assets at fair market price. Management recommends that this offer be accepted because, “We believe our expertise in the energy industry can be better exploited by CEC if we sell our electricity generating and transmission assets and enter the telecommunications business. Although telecommunications is a riskier business than providing electricity as a public utility, it is also potentially very profitable.” Should the management approve this transaction? Why or why not?

29.11 Freeport Manufacturing is considering making an offer to purchase Portland Industries. The treasurer of Freeport has collected the following information:

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<thead>
<tr>
<th></th>
<th>Freeport</th>
<th>Portland</th>
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<tbody>
<tr>
<td>Price-earnings ratio</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Number of shares</td>
<td>1,000,000</td>
<td>250,000</td>
</tr>
<tr>
<td>Earnings</td>
<td>$1,000,000</td>
<td>$750,000</td>
</tr>
</tbody>
</table>

The treasurer also knows that securities analysts expect the earnings and dividends (currently $1.80 per share) of Portland to grow at a constant rate of 5 percent each year. Her research indicates, however, that the acquisition would provide Portland with some economies of scale that would improve this growth rate to 7 percent per year.

a. What is the value of Portland to Freeport?
b. If Freeport offers $40 in cash for each outstanding share of Portland, what would the NPV of the acquisition be?
c. If instead Freeport were to offer 600,000 of its shares in exchange for the outstanding stock of Portland, what would the NPV of the acquisition be?
d. Should the acquisition be attempted, and if so, should it be a cash or stock offer?
e. Freeport’s management thinks that 7-percent growth is too optimistic and that 6 percent is more realistic. How does this change your previous answers?