Understanding Financial Management: A Practical Guide
Guideline Answers to the Concept Check Questions

Chapter 5
Valuation

Concept Check 5.1

1. **What is valuation?**

   Valuation is the process that links risk and return to estimate the worth of an asset or a firm.

2. **What are five types of value? How do they differ?**

   The following are five types of value.
   - *Going-concern value* is the value of a firm as an operating business.
   - *Liquidation value* is the projected price that a firm would receive by selling its assets if it were going out of business.
   - *Book value* is the value of an asset as carried on a balance sheet.
   - *Market value* is the price at which buyers and sellers trade similar items in an open market place.
   - *Intrinsic value* is the value at which an asset should sell based on applying data inputs to a valuation theory or model.

   These types of values can differ from one another. For example, a firm's going-concern value is likely to be higher than its liquidation value. The excess of going-concern value over liquidation value represents the value of the operating firm as distinct from the value of its assets. Book value can differ substantially from market value. For example, a piece of equipment appears on a firm's books at cost when purchased but decreases each year due to depreciation charges. The price that someone is willing to pay for the asset in the market may have little relationship with its book value. Market value reflects what someone is willing to pay for an asset whereas intrinsic value shows what the person should be willing to pay for the same asset.

3. **Under what circumstances can the market value and intrinsic value of a financial asset differ?**

   Efficient market theory holds that market prices reflect the knowledge and expectations of all investors. Thus, the price for which a financial asset should sell in the market should be the same as its actual price. In market equilibrium, financial assets would be properly valued, not undervalued or overvalued. In less than perfectly efficient markets, market value and intrinsic value may differ.

4. **Why should a financial manager understand the valuation process?**

Corporate managers, especially financial managers, should understand the valuation process to maximize value or stockholder wealth as reflected in the market price of the stock. Financial decisions may influence a firm's risk-return characteristics. Such decisions result in changes in both cash flows and the required rate of return, which in turn lead to changes in the price of the firm's common stock. The failure of financial managers to understand the valuation process could lead to sub-optimal decisions and impede their ability to maximize firm value or shareholder wealth.

5. **How does discounted cash flow (DCF) valuation differ from relative valuation?**

Discounted cash flow valuation relates the value of an asset to the present value of the expected future cash flows of that asset. It serves as a way of estimating the intrinsic value of a security. *Relative valuation* estimates the value of an asset by examining the pricing of similar assets relative to a common variable such as earnings, cash flows, book value, or sales. Although relative valuation provides information on current valuation, it does not provide guidance about the appropriateness of the current valuations. This approach measures relative value, not intrinsic value. Relative valuation techniques are useful to consider when a good set of comparable entities is available and when serious undervaluation or overvaluation does not prevail in the market.

6. **What is the basic DCF valuation model and its three key inputs?**

As Equation 5.1 shows, the basic DCF valuation model is $V_0 = \sum_{t=1}^{n} \frac{CF_r}{(1+k)^t}$, where V_0 is the intrinsic value of an asset a time zero; CF_t is the expected future cash flow at the end of year t, k is the appropriate required rate of return; n is the remaining term to maturity, and t is the time period. The model's three key inputs are the: (1) expected cash flows (returns) generated by the asset over its life, (2) timing of the cash flows, and (3) riskiness associated with these cash flows as measured by the required rate of return. A direct relationship exists between the value of a financial asset and the amount of expected cash flows. Holding the other inputs constant, value rises as the expected cash flows increase. There is an inverse relationship between value and risk. When holding the other variables constant, value falls as risk increases. The timing of cash flows affects the value of a financial asset. If the other variables remain constant, receiving the same cash flow sooner rather than later leads to a higher value.

7. **What are the three steps in the DCF valuation process?**

The DCF valuation process involves (1) estimating the future cash flows expected over the life of the asset, (2) determining the appropriate required rate of return on the asset, and (3) calculating the present value of the estimated cash flows using the required rate of return as the discount rate.

8. **How do the cash flows differ between bonds and common stock?**

For bonds, the cash flows represent coupon interest payments and the recovery of the principal (or par value) at maturity or retirement. For common stock, the cash flows can be dividends or free cash flow to equity.

9. **What are the three major components of the required rate of return?**

The three major components of the required rate of return are the (1) real risk-free rate of interest, (2) expected inflation rate premium, and (3) risk premium. Combining these three components results in an estimate of an asset's required rate of return.

Concept Check 5.2

1. **Why may the market price of a bond not equal its par value?**

The par value of a bond may not equal its market value or price. *Par value* is equal to the nominal or face value of a bond. The price of a bond may differ from its par value due to differences between its coupon rate and prevailing market interest rates. If investors require a higher (lower) rate of return than provided by the bond's coupon rate, the bond will trade below (above) its par value. In this situation, the bond would sell at discount or a premium, respectively, relative to its par value.

2. **How do zero coupon bonds differ from floating rate bonds?**

A *zero coupon bond* is a bond that makes no periodic interest payments and sells at a deep discount from its par value. The buyer of a zero coupon bond receives that rate of return by the gradual appreciation of the security, which the buyer redeems at face value on a specified maturity date. A *floating rate bond* is a debt instrument with a variable rate of interest. The coupon rates on floating-rate bonds are reset periodically, often every 6 or 12 months, depending on interest rate conditions in the market and are tied to a money-market index such as Treasury bill rates. Floating rate bonds provide holders with protection against rises in interest rates.

3. **What types of embedded options favor the issuer and which ones favor bondholders? Why?**

An *embedded option* is a provision in a bond indenture giving the issuer and/or the bondholder an option to take some action against the other party. Examples of embedded options are call provisions, accelerated sinking fund provisions, conversion rights, and put provisions. The first two embedded options favor the issuer, while the latter two favor the bondholders.

- A *call provision* gives the issuer the right to buy back or "call" all or a part of a bond issue before maturity (under specified terms). An issuer would typically call a bond when interest rates fall below the issue's coupon rate. Thus, the issuer can retire an issue that currently pays higher than market interest rates.
- An *accelerated sinking fund* provision permits the issuer to retire more than is necessary to meet the sinking fund requirement. An issuer would usually exercise this embedded option when interest rates decline below the issue's coupon rate. Thus, the issuer can retire part of a bond issue even if other restrictions exist to prevent calling the issue.
- *A conversion privilege* gives the bondholder the right to convert the bond into a specified number of shares of common stock at a predetermined fixed price. The

value of the conversion privilege depends on the movement of the stock's price that the bondholder can acquire by exercising the conversion option. A rise in the stock price increases the value of the conversion privilege. If the conversion value of the stock exceeds the market value of the bond, the bondholder has an incentive to exercise the conversion privilege.

- A *put provision* gives the bondholder the right to sell the bond back to the issuer at the put price on certain dates before maturity. The put privilege benefits the bondholder if market interest rates rise above the issue's coupon rate.
- A *cap* and a *floor* on a floating-rate bond are embedded options requiring no action. A cap on a floater benefits the issuer if interest rates rise, while a floor on a floater benefits the bondholder if interest rates fall. With a cap, the bondholder gives the issuer the right not to pay more than the cap. With a floor, the issuer gives the bondholder the right to receive not less than the floor.

4**. What is the purpose of an indenture?**

An *indenture* is a formal agreement between an issuer of bonds and the bondholder covering the terms and conditions of the debt issue. Such considerations include the type of bond, amount of the issue, property pledged as collateral, covenants, embedded options, and other matters. The purpose of this agreement is to address all matters pertaining to the bond.

5. **What are protective covenants? What are examples of negative covenants and positive covenants?**

A *covenant* is a promise in an indenture of a debt agreement that the borrower will perform certain acts and will refrain from others. *Negative covenants* limit or prohibit the borrower from taking certain actions. These actions may include paying too much dividends, pledging assets to other lenders, selling major assets, merging with another firm, and adding more long-term debt. *Positive* or *affirmative covenants* are actions that the borrower promises to perform. These actions may include maintaining certain ratios, keeping collateral in good condition, and making timely payments of principal and interest. Failing to adhere to these covenants could place borrower in default.

6. **What is the priority of claims on the assets of the issuer for secured debt, debentures, and subordinated debentures?**

Priority of claims refers to the order that various claimants have on assets in the event that the borrower experiences financial distress. Holders of secured debt have a prior claim to the issuer's assets compared to those holding unsecured debt (debentures). With a subordinated debenture, the claims against a firm's assets are junior to those of secured debt and regular debentures. That is, subordinated debt is repayable only after satisfying other debts with a higher claim.

7. **What does a bond rating say about the potential default risk of a bond?**

A *bond rating* is an appraisal of the financial strength of the issuer of a bond. As such, a bond rating shows the possibility of default by a bond issuer. Bond rating services such as Standard & Poor's and Moody's Investors Service examine the financial strength of issuers. Using S&P's system, the ratings range from AAA, which represents a highly

unlikely chance to default, to D in default. The higher the bond rating, the lower is the possibility of default.

Concept Check 5.3

1. **What are the two distinct types of cash flows associated with a straight bond?**

   A *straight bond* is a bond without any embedded options. Bondholders of a straight bond receive two distinct types of cash flows: (1) the periodic coupon interest payments and (2) the maturity value at the end of the bond's life.

2. **What is the meaning of *default risk* and *call risk*?**

   Default risk is the possibility that the issuer will fail to meet its obligations with respect to the timely payment of interest and repayment of the amount borrowed. If default occurs, bondholders may make claims against the assets of the issuer to recoup their principal. *Call risk* is the possibility that the issuer will call a bond and expose the investor to an uncertain cash flow pattern.

3. **What are the three adjustments needed to convert the formula for an annual-pay bond into a semiannual-pay bond?**

   The adjustments for converting an annual-pay bond into a semiannual-pay bond are as follows:
   - divide the annual interest, I, by 2 to get the semi-annual interest
   - divide the annual discount rate, k_b, by 2 to get the semi-annual discount rate; and
   - multiply the number of years until maturity, n, by 2 to get the number of six-month periods to maturity.

4. **Why does a zero coupon bond typically sell at a discount to its par value?**

   A zero coupon bond does not make periodic coupon payments. When issued, investors buy the bond substantially below its par value. Holders realize interest by buying the bond at a discount. The difference between the par value and the price paid for the bond represents interest. Thus, the issuer pays the interest at the maturity date.

Concept Check 5.4

1. **Should bond prices rise or fall as the general level of interest rates in the economy rise?**

   The price of a bond varies inversely with the bond's required rate of return. Thus, bond prices should fall as the general level of interest rates in the economy rises.

2. **If a bond has a coupon rate that exceeds its required rate of return, should the bond sell at a discount or a premium? Why?**

The bond should sell at a premium**.** When the required return is less than the coupon rate, the price of a bond will be greater than its par value. Investors are willing to pay more than par for this bond because it offers a greater return than they can receive in the market for bonds having the same risk level.

3. **What does the term *positive convexity* mean?**

Convexity refers to the shape or curvature of the price/yield relationship. *Positive convexity* refers to the price/yield relationship for an option-free bond. With positive convexity, bond prices go up faster than they go down as rates change.

4. **What happens to the price of a discount and a premium bond as it approaches maturity?**

As the maturity date of a bond approaches, the price of the bond will approach its par value. This characteristic of bonds refers to *price convergence*.

Concept Check 5.5

1. **What does *interest rate risk* mean?**

Interest rate risk is the sensitivity of bond prices to changes in interest rates. If market interest rates rise, investors face a decrease in the price of a bond. Interest rate risk is a major risk faced by investors in the bond market.

2, **What relationship exists between changes in interest rates and bond prices?**

The price of a fixed-coupon bond changes in the opposite direction of the change in interest rates. Bond prices fall (rise) when interest rates rise (fall).

3. **How do the *term to maturity* and *coupon rate* affect the interest rate risk of a bond?**

All other things being equal, the longer the remaining term to maturity and the lower the coupon rate, the greater is the interest rate risk of the bond. As interest rates increase, prices will fall more rapidly for longer-term bonds with low coupon rates than for shorter-term bonds with high coupon rates.

4. **Two 30-year bonds are alike in all respects except Bond A's coupon rate is 6 percent and Bond B's coupon rate is 12 percent. Which of the two bonds will have the greater relative market price increase if interest rates decrease sharply? Why?**

Bond A, the lower coupon rate bond, will have the greater relative market price increase if interest rates decrease sharply due to the shape of the price/yield relationship. Given both bonds have the same term to maturity, low coupon bonds have greater price

sensitivity (interest rate risk) to changes in the required rate of return than do high coupon bonds.

Concept Check 5.6

1. **What are three basic sources of return that may comprise the yield on a bond?**

   Bond yield measures incorporate (1) periodic coupon interest payments, (2) recovery of the principal along with any capital gain or loss, and (3) reinvestment income.

2. **Which sources of return are included in calculating the current yield, yield to maturity, and yield to call?**

   Current yield (CY) is a return measure that relates the annual coupon interest to the bond's current price. Thus, CY only considers the coupon payment as a source of return. Unlike the CY, *yield to maturity* (YTM) considers not only the coupon income but also any capital gain or loss that the investor will realize by holding the bond to maturity and reinvestment income. As with YTM, *yield to call* (YTC) considers all three sources of potential return of owning a bond.

3. **What conditions cause a bond to sell at par value, a premium, or a discount?**

   A bond sells at par value when the coupon rate, current yield, and yield to maturity are all equal. A bond sells at a premium when the coupon rate is greater than the current yield and when the current yield is greater than the yield to maturity. A bond sells at a discount when the coupon rate is less than the current yield and when the current yield is less than the yield to maturity.

4. **Under what circumstances will the yield to maturity and the realized yield differ?**

   The yield to maturity and the realized yield will differ if the investors do not (1) hold the bond to maturity, (2) receive all coupon payments in a prompt and timely fashion, and (3) reinvest all coupons to maturity at a rate of return that equals the bond's yield to maturity.

5. **What is the meaning of *reinvestment rate risk*?**

   Reinvestment rate risk is the risk that the holder must reinvest the proceeds available for reinvestment at an interest rate lower than the instrument that generated the proceeds. For example, callable bonds are subject to reinvestment rate risk. The issuer typically calls a bond to lower its interest expense because interest rates have declined since issuing the bond.

6. **How does *yield to call* differ from *yield to maturity*?**

   Yield to call (YTC) measures the yield on a bond assuming the issuer redeems the bond at the first call date specified in the indenture agreement. *Yield to maturity* (YTM)

measures the rate of return an investor will receive by holding a long-term, interest-bearing bond to its maturity date. The two calculations are the same except YTC replaces the principal value at maturity with the first call price and the maturity date with the first call date.

7. **For bonds selling at a premium, what is the relationship between the yield to call and the yield to maturity?**

For bonds selling at a premium, the yield to maturity (YTM) will always be greater than the yield to call (YTC). The lower of the YTC and the YTM generally serves as the more realistic rate of return to the investor. This assumes that the issuer typically puts the firm's interest before that of the investor and will call the bonds if doing so benefits the firm. A bond selling at a premium suggests that interest rates have declined since the firm issued the bond. The issuer is likely to call a bond selling at a premium to reduce its interest expense.

Concept Check 5.7

1. **Explain the difference between primary and secondary market transactions?**

The *primary market* is the market for new issues of securities. In a primary market transaction, the proceeds of the sale go to the issuer of the securities sold. The *secondary market* is the market where investors buy and sell previously issued securities. In a secondary market transaction, the proceeds of the sale accrue to the seller, not to the firm that originally issued the securities.

2. **What is a yield spread?**

Yield spread is the difference in yield between various issues of securities. For bonds, yield spread generally refers to issues of different credit quality because issues with the same maturity and quality would typically have the same yields. Computing the yield spread involves subtracting the yield of one bond from another, commonly a benchmark Treasury issue with the same maturity.

Concept Check 5.8

1. **Why is preferred stock a hybrid security?**

Preferred stock is a hybrid security because it has features of both debt and common stock. Like corporate bonds, preferred stock usually has a par value, a fixed payment, and does not ordinarily carry voting rights. Like many bonds, some preferred stock is callable. Unlike corporate bonds, a preferred stockholder has no immediate legal remedy against the corporation if it misses a scheduled payment. That is, the firm has not defaulted. Like stock, preferred stock does not mature. Thus, unlike bonds, preferred stock has no return of principal. Preferred stock is riskier than a bond issued by the same corporation because of the features of no maturity, no return on principal, and no

default when missing a payment. Preferred stock is less risky than the firm's common stock because the rights involving the distribution of earnings and assets are somewhat more favorable than are the rights of common stockholders.

2. **What is the importance of a cumulative dividend feature to preferred stockholders?**

Preferred stock usually has a cumulative feature with respect to any dividends passed. If a company omits preferred dividends because of insufficient earnings or any other reason, it must accumulate them until paid out. That is, the firm must pay all dividends in arrears plus the current dividend to preferred stockholders before paying dividends to common stockholders. The cumulative dividend feature is important to preferred stockholders because it does not place them in quite as risky a position. Preferred dividends have precedence over common dividends.

3. **What are the components in valuing a preferred stock?**

Valuing a preferred stock with a fixed dividend involves the formula $V_p = D_p / k_p$. Thus, the components in valuing a preferred stock are the expected dividends per share on the preferred stock, D_p, and the investor's required rate of return on the preferred stock, k_p.

4. **Is the after-tax yield on a preferred stock typically higher or lower than the after-tax yield on the firm's highest grade bonds? Why?**

For a U.S. corporation with both bonds and preferred stock, preferred stock has a lower before-tax yield than bonds due to the partial tax exclusion on dividends for corporate investors. However, the after-tax yield on the preferred is typically higher than on the firm's highest-grade bonds.

Concept Check 5.9

1. **How do authorized, issued, and outstanding shares differ from one another?**

Authorized shares are the maximum number of shares of any class that a firm's corporate charter allows without further stockholder approval. *Outstanding shares* are the number of shares issued and actually held by the public. A firm repurchasing any of its outstanding shares records these shares as treasury stock. *Issued shares* are the number of authorized shares put into circulation, which includes both outstanding shares and treasury stock. Issued and outstanding shares represent capital invested by the firm's owners and stockholders. The number of issued and outstanding shares may be less than the number of authorized shares. Most companies show the amount of authorized, issued, and outstanding shares in the capital section of their annual reports.

3. **How does majority voting differ from cumulative voting? Which method would tend to favor minority stockholders in electing members to the board of directors?**

In a *majority voting* system, each stockholder may cast one vote for each share of common stock owned. Stockholders must apportion their votes equally among

candidates. If a candidate receives 50 percent plus one vote, this person has a majority of the votes and becomes a director. In a *cumulative voting* system, a single share receives a number of votes equal to the total number of directors to be elected. Shareholders can cast all their votes for one candidate. Assuming a shareholder has 100 shares and five directors are to be elected, the total number of votes is 500. The majority voting method lets the shareholder cast 100 votes for each of five candidates for director. The cumulative voting method permits giving the votes to any candidate(s) the stockholder wants. For example, the shareholder could cast all 500 votes for one candidate or split the votes among several candidates. Cumulative voting improves the chances of minority shareholders naming representatives to the board of directors.

4. **How can a preemptive right benefit stockholders?**

A preemptive right gives existing stockholder the opportunity to buy shares of a new issue before the firm offers these shares to others. This right protects shareholders from dilution of value and control when a firm issues new shares. Preemptive rights tend to be the exception rather than the rule.

Concept Check 5.10

1. **What is the difference between an infinite-period and a finite-period dividend discount model?**

A finite-period valuation model assumes an investor plans to buy a common stock and hold it for a limited period. The holding period may be for one or more periods. An infinite-period valuation model assumes an investor plans to buy a common stock and hold it indefinitely.

2. **What are two measures of cash flows used in valuation?**

Two measures of cash flows used in valuation are dividends and free cash flow to equity (FCFE). The basis of the dividend discount model is that the only cash flows received by stockholders are dividends. FCFE measures what a firm can afford to pay out as dividends. Many companies payout less than their FCFE in the form of dividends, while some payout more. Thus, these two valuation methods may result in different estimates of value when dividends differ from FCFE.

3. **How do zero-growth, constant-growth, and variable models differ?**

The *zero-growth valuation model* assumes dividends remain a fixed amount over time. That is, the growth rate (g) of dividends is zero. The *constant-growth valuation model* assumes dividends per share will grow at a constant rate each period. A *variable-growth valuation model* allows for a change in the dividend growth rate. That is, different growth rates occur during specific segments of the overall holding period.

4. **Why must the required rate of return be greater than the growth rate in the constant growth DDM?**

As Equation 5.21 shows, the constant growth valuation model is $V_s = D_1/(k_s - g)$. Unless the discount rate (k_s) is greater than the growth rate (g), the model breaks down and the results are nonsense. This is because the denominator becomes negative. A nonsensical valuation results when dividing a negative number into some positive value of dividends (D_1).

5. **How can changes in the relationship between the required rate of return and the growth rate affect the value of a stock?**

The effect on value (V_s) of changes in the discount rate (k_s) and the growth rate (g) becomes apparent by examining the constant growth valuation model, $V_s = D_1/(k_s - g)$, shown in Equation 5.21. Holding D_1 constant, the stock value falls (rises) as the difference between k_s and g widens (narrows). As the growth rate converges on the discount rate, the value goes to infinity. Small changes in the difference between k_s and g can lead to large changes in the stock's value.

6. **What are the uses and limitations of the four price relatives?**

In general, relative multiples such as price-to-earnings, price-to-cash flow, price-to-market value, and price-to-sales can be useful because of their simplicity and intuitive appeal. However, directly comparing multiples can lead to erroneous conclusions without controlling for differences in fundamentals between the firm being valued and the comparable group. Usually, managers and analysts make adjustments subjectively to reflect differences

Some specific pros and cons of each price multiple follow.

- **Price-to-earnings (P/E)**
  Pros: Earnings per share is the primary determinant of investment value; the P/E ratio is popular in the investment community.
  Cons: Earnings is subject to potential manipulation; the P/E ratio is affected by business cycles; and the possibility of negative earnings produces a useless P/E ratio.
- **Price-to-cash flow (P/CF)**
  Pros: Cash flow is more difficult for managers to manipulate than earnings; P/CF is more stable than P/E.
  Cons: Multiple measures of cash flows exist; the P/CF ratio lacks meaning when cash flows are negative.
- **Price-to-book (P/BV)**
  Pros: Book value is usually positive and is more stable than earnings per share.
  Cons: Different accounting conventions such as depreciation methods can affect book value; P/BV ratios ignore the value of nonphysical assets such as human capital.
- **Price-to-sales (P/S)**
  Pros: The P/S multiple is usually positive and less volatile than is P/E and more difficult to manipulate than P/E and P/BV.
  Cons: Stability or growth in sales does not necessarily indicate operating profits.