Common Stock Valuation

Chapter 6

Security Analysis: Be Careful Out There

• Fundamental analysis is a term for studying a company’s accounting statements and other financial and economic information to estimate the economic value of a company’s stock.

• The basic idea is to identify “undervalued” stocks to buy and “overvalued” stocks to sell.

• In practice however, such stocks may in fact be correctly priced for reasons not immediately apparent to the analyst.

The Dividend Discount Model

• The Dividend Discount Model (DDM) is a method to estimate the value of a share of stock by discounting all expected future dividend payments. The basic DDM equation is:

\[
P_0 = \frac{D_1}{1+k} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \cdots + \frac{D_T}{(1+k)^T} \]

• In the DDM equation:
  - \( P_0 \) = the present value of all future dividends
  - \( D_t \) = the dividend to be paid \( t \) years from now
  - \( k \) = the appropriate risk-adjusted discount rate

The Dividend Discount Model: the Constant Growth Rate Model

• Assume that the dividends will grow at a constant growth rate \( g \). The dividend next period (\( t+1 \)) is:

\[
D_{t+1} = D_t \times (1+g) \]

So, \( D_2 = D_1 \times (1+g) = D_0 \times (1+g) \times (1+g) \)

• For constant dividend growth for \( T \) years, the DDM formula becomes:

\[
P_0 = \frac{D_1(1+g)}{k-g} \times \left( \frac{1+g}{1+k} \right)^T \]

if \( k > g \)

\[
P_0 = T \times D_0 \]

if \( k = g \)

The Dividend Discount Model: the Constant Perpetual Growth Model

• Assuming that the dividends will grow forever at a constant growth rate \( g \).

• For constant perpetual dividend growth, the DDM formula becomes:

\[
P_0 = \frac{D_0 \times (1+g)}{k-g} = \frac{D_0}{k-g} \quad \text{(Important: } g < k)\]

The Dividend Discount Model: Estimating the Growth Rate

• The growth rate in dividends (\( g \)) can be estimated in a number of ways:
  - Using the company’s historical average growth rate.
  - Using an industry median or average growth rate.
  - Using the sustainable growth rate.
The Sustainable Growth Rate

\[ \text{Sustainable Growth Rate} = \text{ROE} \times (1 - \text{Payout Ratio}) \]

- Return on Equity (ROE) = Net Income / Equity
- Payout Ratio = Proportion of earnings paid out as dividends
- Retention Ratio = Proportion of earnings retained for investment

The Two-Stage Dividend Growth Model

- The two-stage dividend growth model assumes that a firm will initially grow at a rate \( g_1 \) for \( T \) years, and thereafter grow at a rate \( g_2 < k \) during a perpetual second stage of growth.

The Two-Stage Dividend Growth Model formula is:

\[ P_0 = \frac{D_1 (1 + g_1)^T (1 + g_2)}{k - g_2} \]

Discount Rates for Dividend Discount Models

- The discount rate for a stock can be estimated using the capital asset pricing model (CAPM).
- We will discuss the CAPM in a later chapter.
- However, we can estimate the discount rate for a stock using this formula:

\[ \text{Discount rate} = \text{time value of money} + \text{risk premium} \]

\[ = \text{U.S. T-bill Rate} + (\text{Stock Beta} \times \text{Stock Market Risk Premium}) \]

- **T-bill Rate**: return on 90-day U.S. T-bills
- **Stock Beta**: risk relative to an average stock
- **Stock Market Risk Premium**: risk premium for an average stock

Observations on Dividend Discount Models, I.

**Constant Perpetual Growth Model:**

- Simple to compute
- Not usable for firms that do not pay dividends
- Not usable when \( g > k \)
- Is sensitive to the choice of \( g \) and \( k \)
- \( k \) and \( g \) may be difficult to estimate accurately.
- Constant perpetual growth is often an unrealistic assumption.

Observations on Dividend Discount Models, II.

**Two-Stage Dividend Growth Model:**

- More realistic in that it accounts for two stages of growth
- Usable when \( g > k \) in the first stage
- Not usable for firms that do not pay dividends
- Is sensitive to the choice of \( g \) and \( k \)
- \( k \) and \( g \) may be difficult to estimate accurately.

Residual Income Model (RIM), I.

We have valued only companies that pay dividends.

- But, there are many companies that do not pay dividends.
- What about them?
- It turns out that there is an elegant way to value these companies, too.

- The model is called the Residual Income Model (RIM).

**Major Assumption (known as the Clean Surplus Relationship, or CSR):** The change in book value per share is equal to earnings per share minus dividends.
Residual Income Model (RIM), II.

- Inputs needed:
  - Earnings per share at time 0, $EPS_0$
  - Book value per share at time 0, $B_0$
  - Earnings growth rate, $g$
  - Discount rate, $k$

- There are two equivalent formulas for the Residual Income Model:

\[
P_t = B_t + \frac{EPS_0 (1 + g) - B_0 - k}{k - g}
\]

or

\[
P_t = \frac{EPS_0 - B_0 + g}{k - g}
\]

BTW, it turns out that the RIM is mathematically the same as the constant perpetual growth model.

Price Ratio Analysis, I.

- **Price-earnings ratio (P/E ratio)**
  - Current stock price divided by annual earnings per share (EPS)

- **Earnings yield**
  - Inverse of the P/E ratio: earnings divided by price (E/P)

- High-P/E stocks are often referred to as *growth stocks*, while low-P/E stocks are often referred to as *value stocks*.

Price Ratio Analysis, II.

- **Price-cash flow ratio (P/CF ratio)**
  - Current stock price divided by current cash flow per share
  - In this context, cash flow is usually taken to be net income plus depreciation.

- Most analysts agree that in examining a company’s financial performance, cash flow can be more informative than net income.

- Earnings and cash flows that are far from each other may be a signal of poor quality earnings.

Price Ratio Analysis, III.

- **Price-sales ratio (P/S ratio)**
  - Current stock price divided by annual sales per share
  - A high P/S ratio suggests high sales growth, while a low P/S ratio suggests sluggish sales growth.

- **Price-book ratio (P/B ratio)**
  - Market value of a company’s common stock divided by its book (accounting) value of equity
  - A ratio bigger than 1.0 indicates that the firm is creating value for its stockholders.