SECURITY VALUATION
STOCK VALUATION

Features:

1. Claim to residual value of the firm (after claims against firm are paid).
2. Voting rights
4. Multiple Classes of common stock (Class A and B)
5. Unlimited life.

The Key Models of Equity Valuation

1. Discounted Cash Flow (Present Value) Models
   a. Dividend Discount Models
   b. Free Cash Flow to Equity Models: Stock’s value estimated as the present value of cash available to shareholders after capital expenditures and working capital expenses

2. Multiplier (Market Multiple) Models
   a. Fundamental Models: Stock’s value estimated using the ratio of the stock price to company fundamentals (earnings, sales, book value, cash flow per share)
   b. Enterprise Value Models: Stock’s value estimated using the ratio of enterprise value to either EBITDA or revenue
      i. Enterprise Value: MV(outstanding shares) - cash - short-term liabilities
      ii. Common stock value = enterprise value - value of liabilities and preferred stock

3. Asset-Based Models: Value = Total Assets – Liabilities – Preferred Stock
   a. Typically book values of assets and liabilities adjusted to fair values to estimate the market value of equity

To value common stock, we will start with the fact that the payoff to common stock owners comes in two forms:

1. Dividends (Dt)
2. Capital Gains (Pt+1-Pt)
Expected Holding Period Return

1. The return on a stock investment comprises cash dividends and capital gains or losses
   a. Assuming a one-year holding period

   \[
   \text{Expected HPR} = E(r) = \frac{E(D_1) + [E(P_1) - P_0]}{P_0}
   \]

   \[
   k_s = \frac{D_1 + (P_1 - P_0)}{P_0}
   \] (1)

   where \( P_1 \) is the expected price in one period. In a world of certainty, \( P_1 \) is the known price in one period and \( k_s \) is the known, riskless one-period rate of return. With uncertainty, \( k_s \) is the opportunity cost, the required expected return on assets of “equivalent risk.”

   Example: Suppose IBM is selling for \$100 a share. Investors expect a \$5 cash dividend next year (i.e., one year from now). They also expect the stock to sell for \$110 a year from now. What is the expected return to stockholders over the next year.

   \[ k_s = (5 + 110 - 100)/100 = 15/100 = 15\%. \]

Intrinsic Value & Market Price

1. Intrinsic (Fundamental) Value
   a. The rational value investors would place on the asset if they had full knowledge of the asset’s characteristics
   b. The present value of a firm’s expected future net cash flows discounted by a risk adjusted required rate of return
   c. Analyst estimate with valuation models and compare to the market price to determine if individual stocks are overvalued, undervalued, or fairly valued.
   d. Intrinsic value today is denoted \( V_0 \) and for a 1-year holding period is found by

   \[
   V_0 = \frac{E(D_1) + E(P_1)}{1 + k_s}
   \]

2. Market price deviations from intrinsic values
   a. Market price viewed as consensus value of all traders
   b. In equilibrium the current market price will equal intrinsic value

   Compare Market price to intrinsic value to identify trading signals
Intrinsic Value > Market Price → Undervalued
   • Buy

Intrinsic Value < Market Price → Overvalued
   • Sell or Short Sell

Intrinsic Value = Market Price → Fairly Priced
   • Hold

**Security Valuation**

**Profitable Security Valuation Depends On**
   • Market prices being able to deviate from intrinsic value now and converge towards it in the future

**Market Price More Likely Correct If:**
   • Followed by many analyst
   • Unconfident in inputs and applicability of the model

**Present Value Models: Dividend Discount Model (DDM)**

1. **Rationale**
   a. Intrinsic value of stock is the present value of its future dividends

2. **General Form**

   \[
   V_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1 + k_e)^t}
   \]

   i. \( V_0 \) = current stock value
   ii. \( D_t \) = dividend at time \( t \)
   iii. \( k_e \) = required rate of return on common equity

   b. Uses infinite holding period because a corporation has an indefinite life

   **The value of one share of common stock is simply the present value of all expected future dividends paid to that share of stock discounted at the firm’s cost of capital**
One-year holding period DDM

a. Current value is the present value of any dividends during the year plus the present value of the expected price of the stock at year-end (terminal value)

\[ V_0 = \frac{D_1 + P_1}{(1 + k_e)} \]

b. 

c. **Example**: Calculate the value of a stock that paid a $2.50 dividend last year, if the dividend is expected to grow 3.5% and the terminal value is expected to be $21.34. The required rate of return on the stock is 15%

i. Step 1: \( D_1 = D_0 \times (1 + g_{\text{div}}) = \$2.50 \times (1.035) = \$2.5875 \)

ii. Step 2: PV(Expected Cash Flows)
   1. PV(D₁) = $2.5875/1.15 = $2.25
   2. PV(V₁) = $21.34/1.15 = $18.5565

iii. Step 3: \( V_0 = PV(D_1) + PV(V_1) = $2.25 + $18.5565 = $20.8065 \)

2. Multiple-year holding period DDM

a. Current value is the present value of estimated dividends over the holding period and the estimated terminal value

b. 

c. **Example**: Calculate the value of a stock that paid a $2.50 dividend last year, if the dividend is expected to grow 3.5% per year and the terminal value at the end of year two is expected to be $25.60. The required rate of return on the stock is 15%

i. Step 1: \( D_1 = D_0 \times (1 + g_{\text{div}}) = \$2.50 \times (1.035) = \$2.5875 \)

ii. Step 2: \( D_2 = D_1 \times (1 + g_{\text{div}}) = \$2.5875 \times (1.035) = \$2.6781 \)

iii. Step 3: PV (Expected Cash Flows)
   1. PV(D₁) = $2.5875/1.15 = $2.25
   2. PV(D₂) = $2.6781/1.15² = $2.025
   3. PV(V₁) = $25.60/1.15² = $19.3573

iv. Step 4: \( V_0 = PV(D_1) + PV(D_2) + PV(V_2) = $2.25 + $2.025 + $19.3573 = $23.6323 \)
Special Case #1: Zero Growth

Assume $D_1 = D_2 = D_3 = \ldots = D_\infty$, so $D_t = D$, and

$$\hat{P}_0 = \frac{D}{1+k_s} + \frac{D}{(1+k_s)^2} + \ldots + \frac{D}{(1+k_s)^n} + \ldots + \frac{D}{(1+k_s)^\infty}$$

With $D_t = D$, the expression is a perpetuity:

$$\hat{P}_0 = \frac{d}{k}$$

Preferred Stock Valuation: No Growth Model

1. General Form

$$V_{0PS} = \frac{D_{PS}}{(1+k_{PS})^1} + \frac{D_{PS}}{(1+k_{PS})^2} + \ldots + \frac{D_{PS}}{(1+k_{PS})^n} + \ldots \frac{D_{PS}}{(1+k_{PS})^\infty} = \frac{D_{PS}}{k_{PS}}$$

Applicable for any security with a fixed and infinite stream of cash flows

2. Example: ABC Corporation issues 2% annual preferred shares with a par value of $100. The required rate of return for the preferred shares is 10%. Calculate the price.

   a. Step 1: $D_{PS} = $100 \times 0.08 = $2$
   b. Step 2: $V_0 = D_{PS}/k_{PS} = $2/0.10 = $20$

3. Example: XYZ Corporation’s 8% semi-annual preferred shares with a par value of $100 have a maturity of one year. The required rate of return for the preferred shares is 10%. Calculate the price.

   a. Step 1: $D_{PS} = $100 \times 0.08/2 = $8$
   b. Step 2: $V_0 = D_1/(1+k_{PS}) + D_2/(1+k_{PS})^2 + V_2/(1+k_{PS})^2$

   $$= \frac{4}{1.05} + \frac{4}{1.05^2} + \frac{100}{1.05^2} = $98.140$$
Example: Suppose Microsoft preferred stock [stock that pays same dividend forever] pays a dividend of $2.50. If the discount rate for the stock is 18%, at what price will the stock sell?

\[ \hat{P}_0 = \]

Example

What is the value of the preferred stock which pays $4.50 dividend per share and the appropriate discount rate is 12%?

**Additional Features of Preferred Stocks:**
1. Sort of a hybrid between common stock and debt.
2. Has no maturity date like common stock.
3. Pays cash dividend (though if not paid, preferred stockholders can not force the firm in bankruptcy) like common stocks.
4. Dividends are constant like bond coupon payments.
5. Have terms like bond convenants, which protects preferred stockholders from common stockholders.
6. Convertible preferred stocks.
Special Case #2: Constant Growth Dividend Model (Gordon Growth Model)

1. Assumptions Needed for the Model to Be Appropriate
   a. Dividends are the appropriate measure of shareholder wealth
   b. The constant dividend growth rate, \( g_c \), and the required return on stock, \( k_e \), are never expected to change
   c. \( k_e > g_c \)

2. General Form
   \[
   V_t = \frac{D_t (1 + g_c)}{k_e - g_c} = \frac{D_{t+1}}{k_e - g_c}
   \]

Comparing No Growth and Constant Growth Models

1. Despite having the same dividend and required rate of return, why do you have to pay more for HIJ’s stock than ABC’s stock?
   a. ABC is zero growth and HIJ is constant growth, and you must pay more for expected growth

2. What is the one year rate of return for each stock?
   a. \[
   \text{ABC (No Growth)} \quad \text{HIJ (Constant Growth)}
   \begin{array}{ll}
   V_0 = $20.00 & V_0 = $53.00 \\
   D = $2.00 & D_0 = $2.00 \\
   V_1 = $2/0.10 = $20.00 & V_1 = ($2.00 \times 1.06^2)/(0.10 - 0.06) = $56.18 \\
   k = ($20 - $20 + $2)/$20 = 10\% & k = ($56.18 - $53 + $2.12)/$53 = 10\%
   \end{array}
   \]

3. Is one a better buy than the other?
   a. Not if both are actually priced at their intrinsic value

Methods for Estimating the Growth Rate in Dividends

1. Use historical growth in dividends for the firm

2. Use the median industry dividend growth rate
3. Estimate the sustainable growth rate
   a. Sustainable growth rate: Rate at which equity, earnings, and dividends can continue to grow indefinitely assuming constant ROE and payout ratio constant and no new equity issuances
   b. 
   
   \[ g = (1 - \text{dividend payout ratio}) \times \text{ROE} = \text{retention rate} \times \text{ROE} \]
   c. earnings and has an ROE of 15%. Calculate and interpret its sustainable growth rate. Example: JBD Inc., is expected to pay dividends equal to 18% of
   i. 
   
   \[ g = (1 - 0.18) \times 0.15 = 12.3\% \]
   ii. With long-term economic growth typically in the single digits, it is unlikely that any firm could sustain a 12.3% growth forever. The analyst should also look into industry and historical growth rates to determine if the estimate is reasonable.

**Dividend Growth’s Role in Intrinsic Value**

1. General Form
   a. \[ PVGO = \frac{D_0(1 + g)}{(k - g)} - \frac{E_1}{k} \]

2. CFA Form
   a. \[ PVGO = \frac{D_0(1 + g_c)}{k_c - g_c} - \frac{D_c}{k_c} \]
   b. Assumes \( g = 0 \), which only happens if \( b=0 \) and thus \( D_0 = D_1 = E_0 = E_1 \)
   i. \( b \) is the retention rate

3. Example: DEF’s stock paid a dividend of $1.25 last year, if dividends are expected to grow forever at 4% and the required return on equity is 12%? What portion of DEF’s estimated value is due to dividend growth?
   a. \[ PVGO = \frac{1.25(1.04)}{(0.12 - 0.04)} - \frac{1.25}{0.12} \]
   = $16.25 - $10.42
   = $5.8
A firm with no current dividend, but one expected in the future

1. Procedure
   a. Determine the reason (distress, higher return by reinvesting than what stockholder could earn by investing dividend elsewhere)
   b. Estimate the amount and timing of the first dividend
   c. Compare to other models due to Gordon growth model’s sensitivity and high degree of uncertainty for the estimates

2. Example: ARD currently does not pay a dividend, but is expected to at the end of year 7. Year 7’s expected earnings are $2.40 and the firm will maintain a retention ratio of 60%. Assuming a constant growth rate of 3% and a required rate of return of 15% estimate the current stock value.

   a. Step 1: \(D_7 = E_7 \times \text{dividend payout ratio}\)
      \[= E_7 \times (1 - \text{retention ratio})\]
      \[= $2.40 \times 0.40\]
      \[= $0.96\]

   b. Step 2: \(V_6 = D_7/(k_e - g_c)\)
      \[= $0.96/(0.15 - 0.03)\]
      \[= $8\]

   c. Step 3: \(V_0 = V_6/(1 + k_e)^6\)

\[D_t = D_0(1+g)^t. \text{ Under constant growth, } g = \text{ constant.}\]

\[
\hat{P}_0 = \frac{D_0(1+g)}{(1+k_s)} + \frac{D_0(1+g)^2}{(1+k_s)^2} + \cdots + \frac{D_0(1+g)^\infty}{(1+k_s)^\infty}.
\]  \hspace{1cm} (1)

With \(g = \text{ constant}\), this equation simplifies to the Gordon model:

\[\hat{P}_0 = \frac{d_1}{k-g}\]  \hspace{1cm} (2)

Example: Suppose Intel has just paid a dividend. The next dividend, to be paid in a year, is forecasted to be $4. If the growth rate of dividends is 7% and the discount rate is 11%, at what price will the stock sell?

\[D_1 = $4, \ g = 7\%, \ k_s = 11\%\]

\[P_0 = \]
Example

What is the value of XYZ’s share if the corporation is expecting to pay a $2 dividend per share at the end of this year and the dividend is expected to grow at 5% forever and the discount rate is 12%?

1. Most applicable to
   a. Stable and mature, non-cyclical, dividend-paying firms

2. Example: What is the intrinsic value of a HIJ’s stock that paid a dividend of $2.00 last year, if dividends are expected to grow forever at 6% and the required return on equity is 10%?

   a. Step 1: \( D_1 = D_0 (1 + g_c) = \$2.00(1.06) = \$2.12 \)

   b. Step 2: \( V_0 = \frac{D_1}{k_e - g_c} = \frac{2.12}{0.10 - 0.06} = \$53.00 \)

3. Key Relationships
   a. An increase (decrease) in \((k_e - g_c)\) → decrease (increase) in stock value
   b. Small changes in \((k_e - g_c)\) can cause large changes in the stock value

Note: There are 4 unknowns in the constant growth dividend model: \( P_0, D_1 \) or \( D_0, k_s \), and \( g \). If you know 3 of the unknowns, you can figure out the other.

Example: Ford can grow at 4 percent rate for the indefinite future. A share of Ford’s stock is selling for $37.50, and is expected to pay a dividend of $3 next year. Suppose GM shares are an equally risky investment. What is the expected rate of return from investing in GM?

\textit{GM’s expected return is equal to Ford’s expected return of 12\% per year.}

Example

If the XYZ is currently selling at $50 per share, expected dividend at the end of this year $3 per share and the growth rate 5% for ever, what is the required rate of return?
What is the price of common share of XYZ if the company paid a dividend last year $3 per share (or just paid today) and the growth rate is 5% forever? The appropriate discount rate is 11%.

**Industry Life Cycle Analysis**

**Five Stages of Industry Life Cycle**

1. **Embryonic**
   - a. Slow growth: Customers are unfamiliar with the product
   - b. High prices: Volume needed for economics of scale not reached
   - c. High investment requirement: Needed develop the product
   - d. High risk of failure: Most embryonic firms fail

2. **Growth**
   - a. Rapid growth: New customers discover the product
   - b. Falling prices: Economies of scale are reached and distribution channels increase
   - c. Limited competitive pressures: Threat of new entrants peaks during the growth phase, but rapid growth allows firm to grow without competing on price
   - d. Increasing profitability: Due to economies of scale

3. **Shakeout**
   - a. Growth has slowed: Demand reaches saturation level with few new customers
   - b. Intense competition: Firm growth must come at the expense of competitors
   - c. Increasing industry overcapacity: Firm investment exceeds increases in demand
   - d. Declining profitability: Due to overcapacity
   - e. Increased cost cutting: Firms restructure to survive and attempt to build brand loyalty
   - f. Increased failures: Weaker firms are liquidated or are acquired

4. **Mature**
   - a. Slow growth: Market is saturated and demand is only for replacement
   - b. Consolidation: Market evolves into an oligopoly
   - c. High barriers to entry: Surviving firms have brand loyalty and low cost structures
   - d. Stable pricing: Firms try to avoid price wars, although they may arise during economic downturns
   - e. Superior firms gain market share: Firms with better products may grow faster
5. Decline  
   a. Negative growth: Due to development of substitutes, societal change, or 
      global competition  
   b. Declining prices: Intense competition and price wars due to overcapacity  
   c. Consolidation: Firm exit or merge  

**Special Case #3: Multistage Growth Model**

Example

When the growth rate is not constant, then the multistage model and the 
constant growth model must be combined as follows:

\[
V_O = \frac{d_1}{1+k} + \frac{d_2}{(1+k)^2} + \frac{d_3}{(1+k)^3} + \ldots + \frac{d_n}{(1+k)^n} + \frac{P_n}{(1+k)^n}
\]

where \( P_n = \frac{d_{n+1}}{k-g} \)

Example:
The Alpha company is expected to grow at 12% for the next two years, then at 10% for another 
three years, and thereafter, to settle down to a growth rate of 6% for the indefinite future. The 
last dividend payment was $2.00 and dividends are expected to increase in proportion 
to the 
growth of the firm. You require a 10% return on your investment. Calculate the fair price for 
Alpha common stock today.

<table>
<thead>
<tr>
<th>Year</th>
<th>Div</th>
<th>Factor</th>
<th>PV of DIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.24(1.12)</td>
<td>.909</td>
<td>2.04</td>
</tr>
<tr>
<td>2</td>
<td>2.51(1.12)</td>
<td>.826</td>
<td>2.07</td>
</tr>
<tr>
<td>3</td>
<td>2.76(1.1)</td>
<td>.751</td>
<td>2.07</td>
</tr>
<tr>
<td>4</td>
<td>3.04(1.1)</td>
<td>.683</td>
<td>2.08</td>
</tr>
<tr>
<td>5</td>
<td>3.34(1.1)</td>
<td>.621</td>
<td>2.07</td>
</tr>
</tbody>
</table>

\[
P_5 = \frac{d_6}{K-g} = \frac{d_5(1+g)}{K-g} = \frac{3.34(1.06)}{.10-.06} = 3.54 = 88.51
\]

\[
PV \text{ Of } P_5 = 88.51(.6209) = 54.96
\]

Price = 10.33 + 54.96 = 65.28
1. Most applicable to
   a. Firms that are expected to grow rapidly, slowly, or erratically over some period, followed by constant dividend growth

2. Procedure
   a. Determine the discount rate, k_e
   b. Project the size and duration of the high initial growth rate, g_H
   c. Estimate dividends during the high-growth period
   d. Estimate the constant growth rate at the end of the high-growth period, g_c
   e. Estimate the first dividend that will grow at the constant rate
   f. Use the constant growth value to calculate the terminal stock value
   g. Add the PV of all dividends to the PV of the terminal stock value

3. Example: HT Inc. just paid a dividend of $2.00. The dividend is expected to grow at 25% for the next 2 years, then 20% for 2 years, after which the dividend is expect to grow at 4% per year, indefinitely. The required rate of return is 12%. Calculate the intrinsic value.
   a. Step 1: Calculate the future dividends
      i. D_1 = D_0 (1 + g_H) = $2(1.25) = $2.50
      ii. D_2 = D_1 (1 + g_H) = $2.50(1.25) = $3.125
      iii. D_3 = D_2 (1 + g_M) = $3.125(1.20) = $3.75
      iv. D_4 = D_3 (1 + g_M) = $3.75(1.20) = $4.50
   b. Step 2: Find the terminal stock value
      i. P_4 = D_4(1+g_c)/(k_e-g_c) = $4.50(1.04)/(0.12 - 0.04) = $4.68/0.08 = $58.50
   c. Step 3: Find the current value as the sum of the PV of future cash flows
      i. P_0 = $2.50/1.12 + $3.125/1.12^2 + $3.75/1.12^3 + $4.50/1.12^4 + $58.50/1.12^4
         = $47.43

4. Test Tip: A common mistake is to forget to discount P_4 back to the present. Do not make these mistakes because exam writers often put common errors as answer choices
Example: Suppose Microsoft just paid a dividend of $1 per share. Microsoft’s dividend is expected to grow at a rate of 14% for the next 2 years, 8% for the following year, and 4% thereafter. If the appropriate discount rate is 10% per year, what is the price of Microsoft common stock?

\[
\begin{align*}
D_0 &= $1.000 \\
D_1 &= $1.140 \\
D_2 &= $1.300 \\
D_3 &= $1.404 \\
D_4 &= $1.460 \\
\vdots \\
\end{align*}
\]

\[\text{Expected Growth Rates} \quad g_1 = 14\% \quad g_2 = 14\% \quad g_3 = 8\% \quad g_4 = g_n = 4\%\]

Required rate of return, \( k_s = 10\% \).  

<table>
<thead>
<tr>
<th>year</th>
<th>Dividend for year ( t )</th>
<th>( 1/(1.1)^t )</th>
<th>( PV(\text{dividend}_t) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( D_1 = D_0 (1 + g_1) = 1.000(1.14) = 1.140 )</td>
<td>( x 0.909 )</td>
<td>( = $1.036 )</td>
</tr>
<tr>
<td>2</td>
<td>( D_2 = D_1 (1 + g_2) = 1.140(1.14) = 1.300 )</td>
<td>( x 0.826 )</td>
<td>( = $1.074 )</td>
</tr>
<tr>
<td>3</td>
<td>( D_3 = D_2 (1 + g_3) = 1.300(1.08) = 1.404 )</td>
<td>( x 0.751 )</td>
<td>( = $1.054 )</td>
</tr>
</tbody>
</table>

\[\text{Present value of } (D_0, D_1, D_2) = $3.164\]

What about \( D_4, D_5, \ldots, D_n, \ldots \)?  

Notice that their growth rate is a constant 4% forever. So, we can employ the constant growth equation.

Value \((D_4, D_5, \ldots, D_n, \ldots)\) in year 3 = \( D_4/(k_s - g_4) = D_3(1+ g_4)/(k_s - g_4) = 1.404(1.04)/(0.10-0.04) = $24.336 \).

\[ PV(D_4, D_5, \ldots, D_n, \ldots) = 24.336/(1.10)^3 = $18.284 \]

\[ P_0 = PV(D_0, D_1, D_2) + PV(D_4, D_5, \ldots, D_n, \ldots) = $3.164 + $18.284 = $21.45. \]
**Free Cash Flow to Equity (FCFE) Discount Models**

1. FCFE: Cash remaining after a firm meets all of its debt obligations and provides for the capex needed to maintain existing assets and to purchase the new assets need to support the assumed growth of the company
   a. \( \text{FCFE} = \text{NI} + \text{Depr} - \text{Increase in working capital} - \text{Fixed Capital Inv (FCInv)} - \text{Debt principal repayments} + \text{New debt issues} \)
   b. \( \text{FCFE} = \text{OCF} - \text{FCInv} + \text{Net borrowing} \)
      a. Net borrowing is the increase in debt during the period (amount borrowed minus amount repaid)

2. Rationale
   a. FCFE reflects the firm’s capacity to pay dividends

3. General Form
   \[
   V_0 = \sum_{t=1}^{\infty} \frac{FCFE_t}{(1 + k_e)^t}
   \]

4. Most Applicable to
   a. Firms where future dividends cannot be estimated with much confidence as long as growth rates of earnings can be estimated
   b. Non-dividend paying firms where estimates of dividend inception are speculative

**Price Multiple Valuation**

1. Rationale
   a. Use multiple to compare to benchmark
   b. Not as sensitive as DDM to its inputs

2. Most applicable to
   a. Firms where future dividends and earnings growth rates are difficult to estimate

3. Trailing versus Forward Multiple
   a. Trailing: Historical data in the denominator
   b. Forward (leading): Projected values in the denominator.

**Multiples Based on Fundamentals**

1. Tells What a multiple should be based on some valuation model

2. Justified \( \frac{P}{E} = \frac{P_0}{E_1} = \frac{D_1/E_1}{k_e - g_c} = \frac{E[\text{Dividend Payout Rate}]}{k_e - g_c} \)
   a. “Justified” because assumes have correct inputs
   b. a.k.a leading P/E ratio
   c. Serves as a benchmark for the price at which the stock should trade

3. **Example:** A firm has an expected dividend payout ratio of 45%, a required rate
of return of 12%, and an expected dividend growth rate of 7%. Calculate the firm’s expected P/E ratio. Interpret this number if the actual P/E is 12.

a. Expected P/E = 0.45/(0.12 – 0.07) = 9
b. Since the expected P/E is lower than the actual P/E the stock is considered overvalued

4. Justified P/E will increase (all else equal) with:
   a. Higher dividend payout rate
   b. Higher growth rate
   c. Lower required rate of return

5. Dividend Displacement of Earnings
   a. All else is not equal because a higher dividend payout rate will lower the firm’s growth rate so the net effect is uncertain

b.

6. **Example:** Below are figures for corporation DEF and its industry. Which of these factors support DEF having a higher P/E ratio? Which does not?

<table>
<thead>
<tr>
<th></th>
<th>DEF</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividend Payout</td>
<td>30%</td>
<td>19%</td>
</tr>
<tr>
<td>Sales Growth</td>
<td>6.1%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Total Debt to Equity</td>
<td>109%</td>
<td>76%</td>
</tr>
</tbody>
</table>

a. Supportive: Higher dividend payout ratio.
b. Supportive: Higher sale growth, which suggests DEF will be able to increase dividends at a faster rate
c. Not Supportive: Higher level of debt, which is indicative of higher risk.