Basic Valuation Theory

Total Return:

\[ r = \frac{c_1}{P_0} + \frac{\Delta P}{P_0} \quad \text{where} \quad \Delta P = P_1 - P_0 \]

- \( c_1 \) is the cash flow payment
- \( P_1 \) is the end of period security value
- \( P_0 \) is the beginning of period security value

Implied Valuation Model:

\[ P_0 = \frac{c_1 + P_1}{1 + r} = \frac{c_1}{1 + r} + \frac{P_1}{1 + r} \]

Weighted Valuation Model:

\[ r = W_a \frac{C_1}{P_0} + W_b \frac{\Delta P}{P_0} \]

where \( w_a \) and \( w_b \) are 1.0
Weighted Valuation Model:

\[ r = w_a \frac{c_1}{P_0} + w_b \frac{\Delta P}{P_0} \]

where \( w_a \) and \( w_b = 1.0 \)

Implied Weighted Valuation Model:

\[ P_0 = \frac{w_a c_1}{(w_b + r)} + \frac{w_b P_1}{(w_b + r)} \]

<table>
<thead>
<tr>
<th>Total Return Index</th>
<th>( c_1 / P_0 )</th>
<th>( P / P_0 )</th>
<th>( r = ) index of total return</th>
</tr>
</thead>
<tbody>
<tr>
<td>( w_a = 1.0 ); ( w_b = 1.0 )</td>
<td>.05</td>
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</tbody>
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BASIC PRICE-EARNINGS RATIO RELATIONSHIPS

\[ P_0 = \frac{dv_0 (1 + g)}{k - g} \]

If \( b \) = fraction of net income reinvested (earnings retained) then \( (1 - b) \) = fraction of net income paid out as dividends.

The reinvested earnings earn a return = \( r \).

\[ P_0 = \frac{ni_0 (1-b) (1+g)}{k - g} \]

\[ \frac{P_0}{ni_0} = \frac{(1-b)(1+g)}{k - g} \]

\[ \frac{P_0}{ni_1} = \frac{(1-b)}{k(1-br/k)} \]

\[ \frac{P_0}{ni_1} = \frac{1*(1-b)}{k * (1-br/k)} \]
PRICE-EARNINGS RATIO RELATIONSHIPS

\[ \frac{P_0}{ni_1} = \frac{1}{k} \ast \frac{(1-b)}{(1-br/k)} \]

*Other things being equal for this basic dividends model framework:*

If \( r = k \) then (price / expected earnings) is:
- independent of the growth rate \( g = br \)
- independent of the dividend payout rate \( (1 - b) \)
- a decreasing function of the level of \( k \)

If \( r > k \) then (price / expected earnings) is:
- an increasing non-linear function of the growth rate
- a decreasing function of the dividend payout rate

If \( r < k \) then (price / expected earnings) is:
- a decreasing non-linear function of the growth rate
- an increasing function of the dividend payout rate
Price-earnings using CAPM for $k$ estimate

$$\frac{P_0}{ni_1} = \frac{1}{(i_{rf} + \beta_f (r_m - i_{rf}))} \ast \frac{(1 - b)}{(1 - b r / (i_{rf} + \beta_f (r_m - i_{rf})))}$$

For two-rate growth models you can start from:

$$P_0 = \frac{dv_0 (1 + g_A) [1 - \frac{(1 + g_A)^N}{(1 + k_A)^N}]}{k_A - g_A} + \frac{dv_{N+1}}{k_F - g_F} \left( \frac{1}{(1 + k_A)^N} \right)$$

PV of high growth dividends  PV of Price at end of period  $N$
Interpreting Two Stage Dividends Growth Model

\[ P_0 = \frac{d v_0 (1 + g_A) [1 - \left(1 + g_A\right)^N]}{k_A - g_A} + \frac{d v_{N+1}}{k_F - g_F} \left(\frac{1}{(1 + k_A)^N}\right) \]

PV of high growth dividends  \( = \)  PV of Price at end of period  \( N \)

\[ P_0 = \left[ \frac{d v_0 (1 + g_A) [1 - \left(1 + g_A\right)^N]}{k_A - g_A} + \frac{d v_{N+1}}{k_F - g_F} \left(\frac{1}{(1 + k_A)^N}\right) - \frac{d v_0 (1 + g_A)}{k_F - g_F} \right] \]

PV of extraordinary growth  (Value of a firm with high growth for first  \( N \)  years minus value of firm if it were a stable growth firm for entire horizon)

\[ + \left[ \frac{d v_0 (1 + g_A)}{k_F - g_F} - \frac{d v_0}{k_F} \right] + \frac{d v_0}{k_F} \]

\( plus \)  PV of stable growth  (Value of a stable growth firm minus value of a no-growth firm)

\( plus \)  PV of assets in place  (Value of a no-growth firm)