How to Value Bonds and Stocks

Bonds (0 coupon, level coupons & Consols), constant/non-constant growth C/S, and GROWTH
Valuation-- Bonds

- Value of any Asset:
  - PV of all future cash flows (FCFs)
    - need estimate of FCFs & discount rate

- Bond: a long-term IOU

- Discount (0 coupon) bonds
  - FCF is face value (F) to be received in ‘T’ yrs.
  - Bond Value = \( F/(1+r)^T \)
Bonds-- Continued

🌟 **Level Coupon Bonds. FCFs:**

1. coupons every period till maturity (annuity)
2. face value at maturity (lump-sum)

\[
\begin{array}{ccccccc}
0 & 1 & 2 & \ldots & T \\
\hline
\text{Coupon} & \text{Coupon} & \text{Coupon} & + \text{F} \\
\end{array}
\]

🌟 **Consols:** Coupon bonds with no maturity; I.e., Perpetuity
Additional Bond Concepts

$r$: YTM (Yield to Maturity)
- rate of return required by the investors
- as $r \uparrow$, $P \uparrow$

Coupon rate fixed at the time of the issue; ‘$r$’ (discount rate/YTM) changes with time
- 10% coupon, 20 yrs. maturity
  - $r = 12\%$, value =?; Discount bond; YTM > C
  - $r = 8\%$, value =?; Premium bond; YTM < C
Bond Concepts-- Contd.

- \( r = 10\% \), value = ?; Par; YTM = C
- 7% coupon, 10 Y. bond for $932.90
- YTM = ??

Semiannual Coupons

- 14s of December 2014 selling for 110 on July 1, 2003
Consider two otherwise identical bonds. The long-maturity bond will have much more volatility with respect to changes in the discount rate.
Consider two otherwise identical bonds.

The low-coupon bond will have much more volatility with respect to changes in the discount rate.
Common Stock Valuation

What are the FCFs?

- \( P_0 \) is a function of \( D_1 \) and \( P_1 \)
- \( P_1 \) is a function of \( D_2 \) and \( P_2 \)  \( \therefore \)
- \( P_0 \) is a function of \( D_1, D_2, \) and \( P_2 ........ \)

- \( P_0 \) is a function of \( D_1, D_2, D_3 .... \)
- \( \text{PV of all expected future dividends} \)
- \( \text{Zero growth: Perpetuity} \quad P_t = D_{t+1} / r \)
Common Stock valuation--contd.

Constant growth: Assume that dividends will grow at a constant rate, $g$, forever.

$$D_T = D_0 (1 + g)^T$$

Growing perpetuity

$$P_t = \frac{D_{t+1}}{(r - g)}$$

‘$g$’ cannot be > ‘$r$’; WHY?
Differential Growth

- Differential growth: 
  \( g_1 \) for \( T \) periods and \( g_2 \) (constant growth) thereafter

- Valuation of a Differential Growth Stock:
  - Estimate future dividends in the foreseeable future.
  - Estimate the future stock price when the stock becomes a Constant Growth Stock
  - Compute the total present value of the estimated future dividends and future stock price
The constant growth phase beginning in year 4 can be valued as a growing perpetuity at time 3.

\[ P_0 = \frac{2.16}{1.12} + \frac{2.33}{(1.12)^2} + \frac{2.52 + 32.75}{(1.12)^3} = \frac{2.62}{0.08} = 32.75 \]
### Stock Market Reporting

<table>
<thead>
<tr>
<th>YTD % Chg.</th>
<th>52 WEEKS HI</th>
<th>52 WEEKS LO</th>
<th>STOCK</th>
<th>SYM</th>
<th>DIV</th>
<th>YLD %</th>
<th>VOL 100s</th>
<th>NET CLOSE</th>
<th>CHG</th>
</tr>
</thead>
<tbody>
<tr>
<td>-13.2</td>
<td>25.72</td>
<td>16.99</td>
<td>Gap Inc</td>
<td>GPS</td>
<td>0.09</td>
<td>0.4</td>
<td>6,2144</td>
<td>20.15</td>
<td>-0.71</td>
</tr>
</tbody>
</table>

- Gap has been as high as $25.72 in the last year.
- Gap has been as low as $16.99 in the last year.
- Gap pays a dividend of 9 cents/share.
- 6,214,400 shares traded hands in the last day’s trading.
- Gap ended trading at $20.15, down $0.71 from yesterday’s close.
- Given the current price the P/E is 17.
Growth?

- A function of # and quality of investment opportunities
- How do you add value to a firm?
  - Identify +NPV projects that lead to **Growth**
- Dividend Growth model and NPVGO approach lead to identical valuations
  - Skip Sec. 5.7
- H.W. 2 - 6, 9, 13, 17, 19, 25, 26, 29