How to Value Bonds and Stocks

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

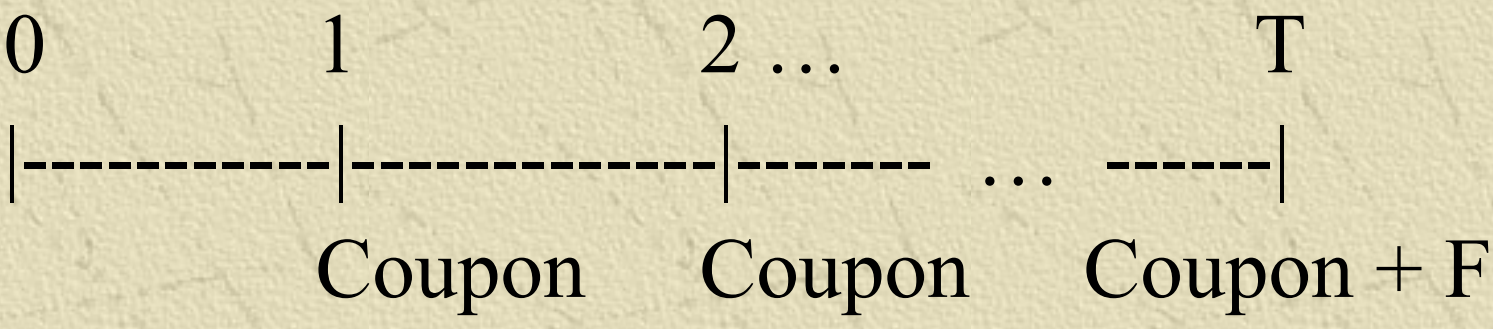
Valuation-- Bonds

- 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)



- **Consols**: Coupon bonds with no maturity; I.e., Perpetuity

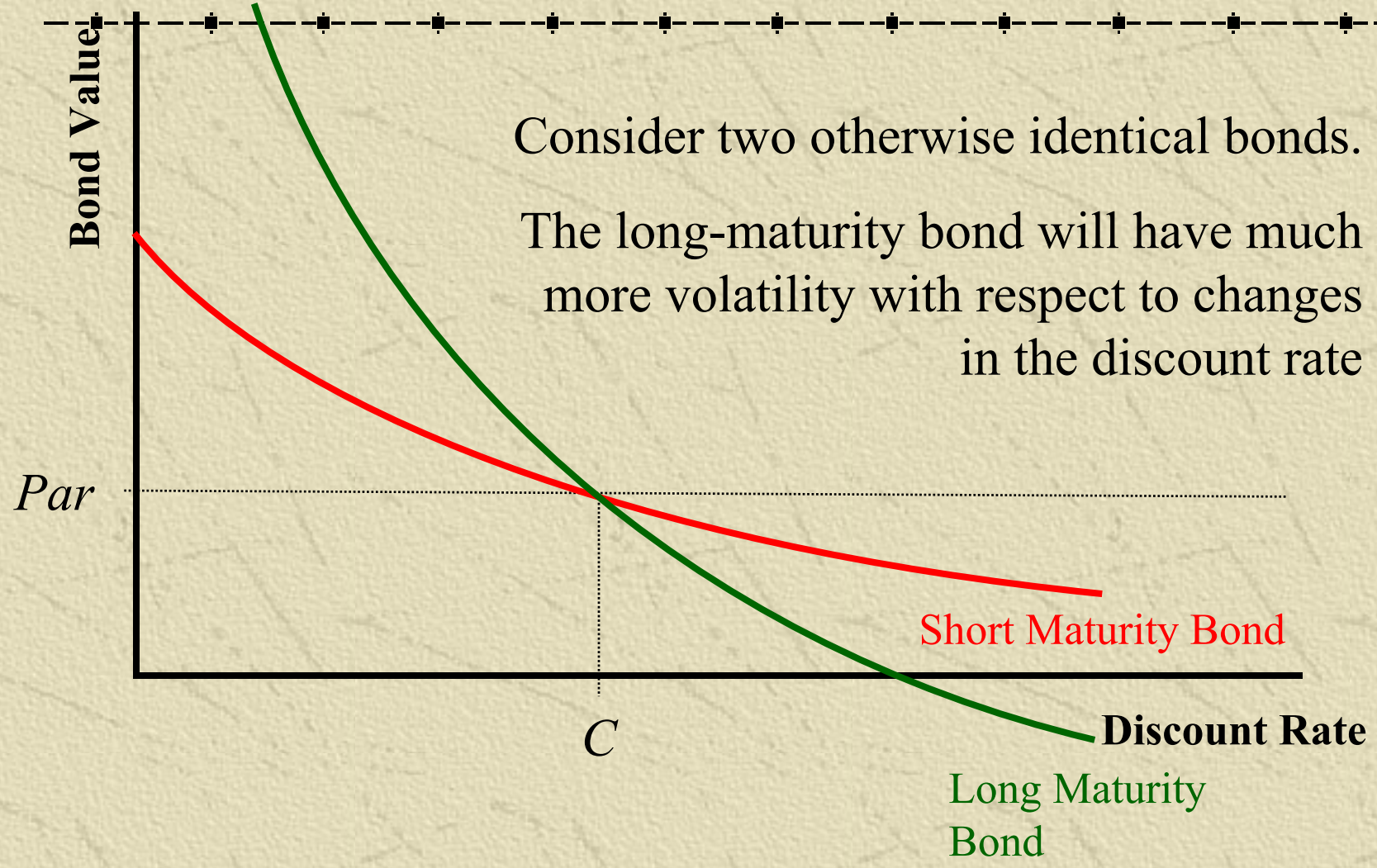
Additional Bond Concepts

- r: YTM (Yield to Maturity)
  - rate of return required by the investors
  - as r ⇧, P ???
- 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

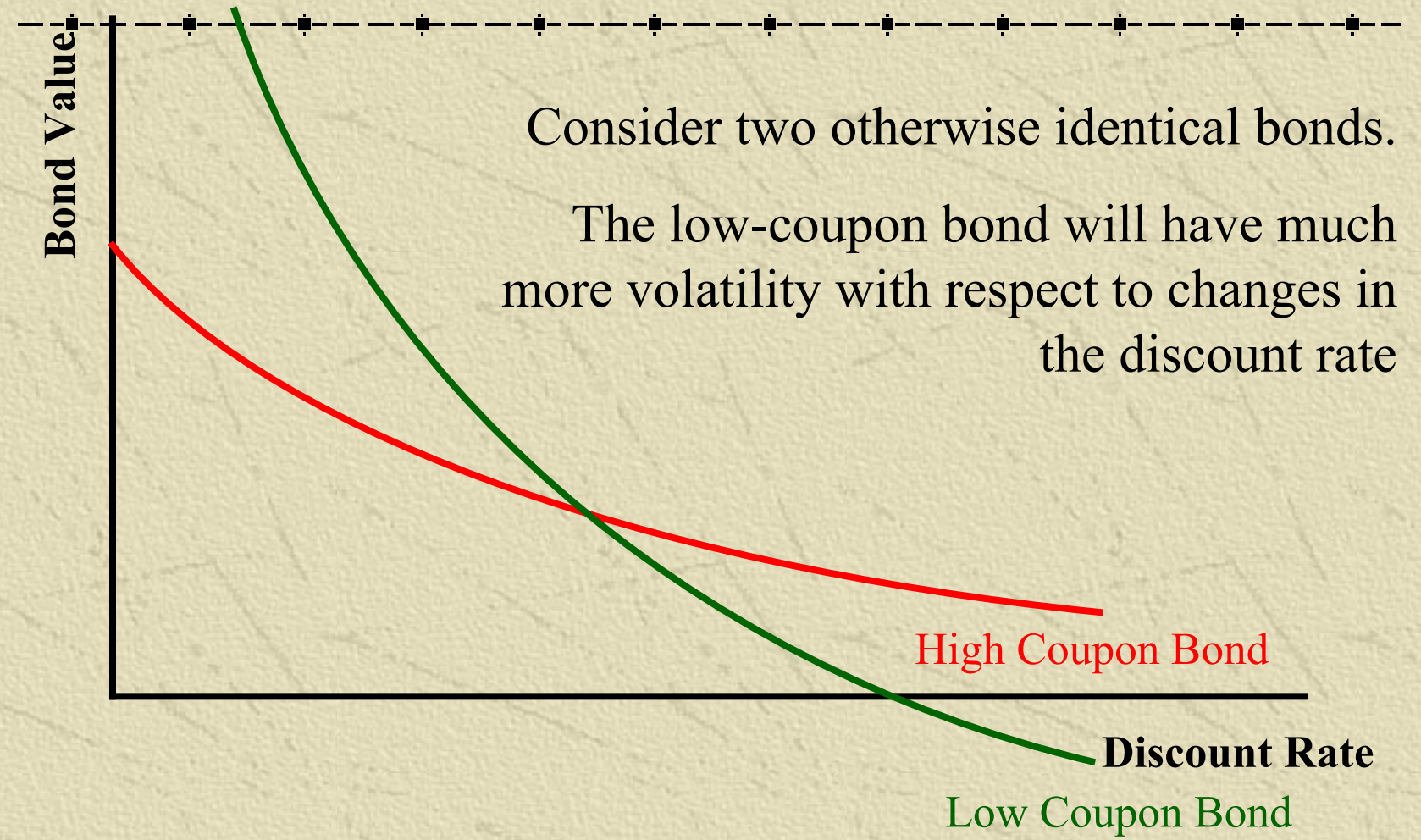
Maturity and Bond Price Volatility



Consider two otherwise identical bonds.

The long-maturity bond will have much more volatility with respect to changes in the discount rate

Coupon Rate and Bond Price Volatility



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 SO
  - 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 …
  - PV of all **expected** *future* dividends
- Zero growth: Perpetuity $P_t = D_{t+1} / r$

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

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

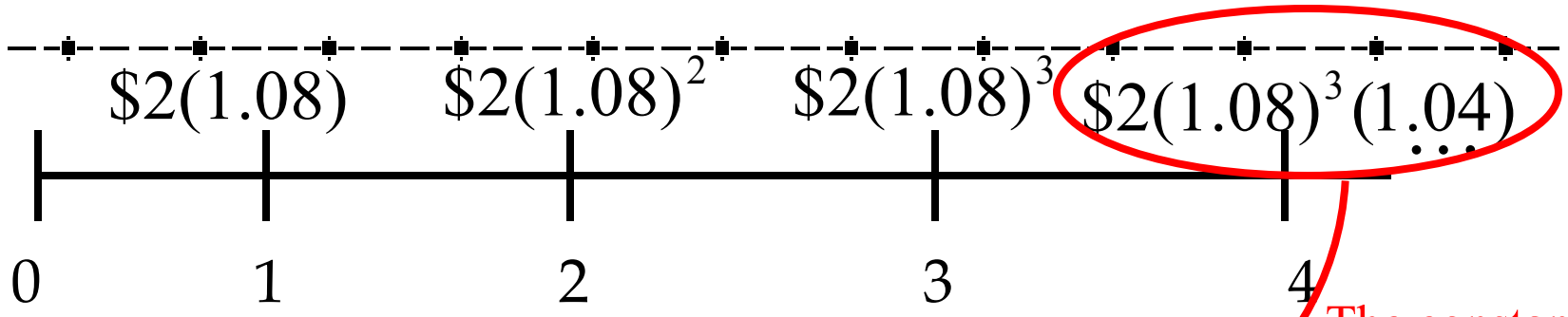
'g' cannot be > 'r'; WHY?

Differential Growth

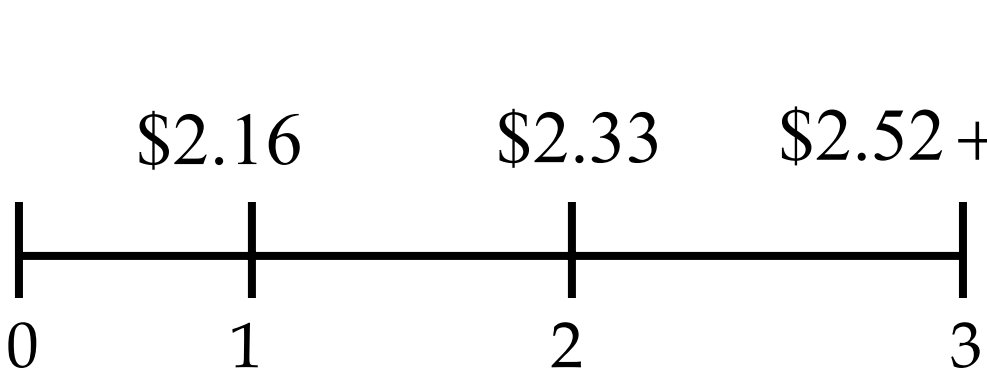
- Differential growth:

  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*.



$$P_3 = \frac{\$2.62}{.08} = \$32.75$$

$$P_0 = \frac{\$2.16}{1.12} + \frac{\$2.33}{(1.12)^2} + \frac{\$2.52 + \$32.75}{(1.12)^3} = \$28.89$$

Stock Market Reporting

YTD % Chg.	52 WEEKS HI	LO	STOCK	SYM	DIV	YLD %	PE	VOL 100s	CLOSE	NET CHG
-13.2	25.72	16.99	Gap Inc	GPS	0.09	0.4	17	62144	20.15	-0.71

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

Given the current price the P/E is 17

Gap ended trading at $20.15, down $0.71 from yesterday's close

6,214,400 shares traded hands in the last day's trading

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