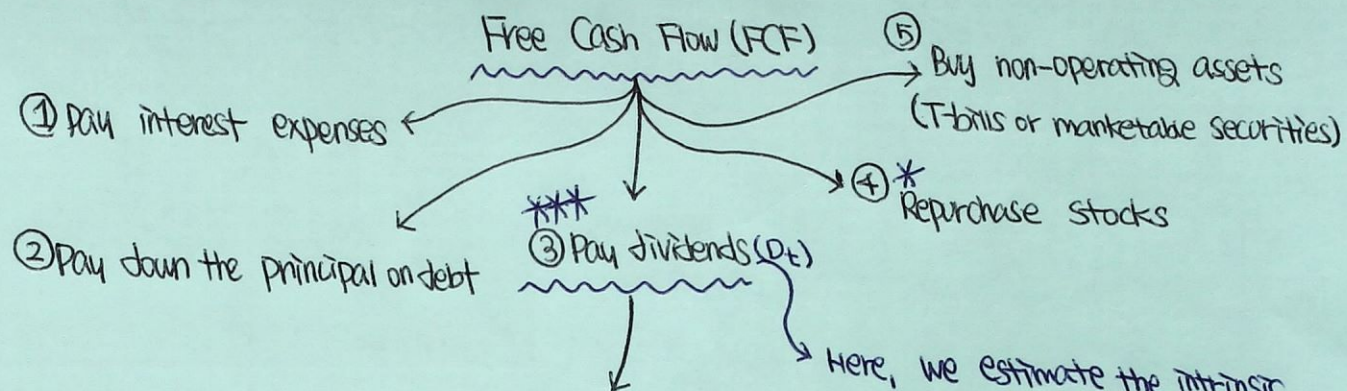


# "Stock Valuation"

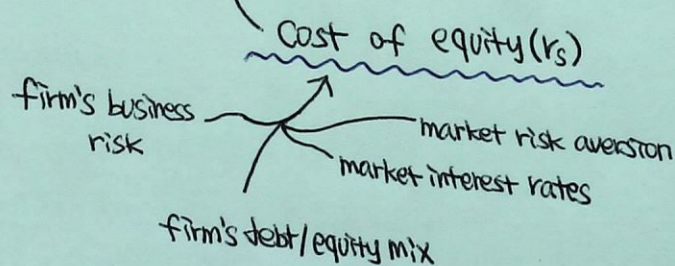
1. Big Picture of this topic;

After FCF becomes positive, a firm/company use it ①~⑤; we focus on ③.



$$\text{Value}_{\text{stock}} = \frac{D_1}{(1+r_s)^1} + \frac{D_2}{(1+r_s)^2} + \dots + \frac{D_{\infty}}{(1+r_s)^{\infty}}$$

Here, we estimate the intrinsic value of stock to discount the cash flows to stockholders (dividend,  $D_t$ ) at the rate of return required by stockholders ( $r_s$ )



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When investing in common stocks, the goal is to purchase stocks that are undervalued, and avoid stocks that are overvalued.

2. The common stockholders are the owners of a corporation. They have the right to elect its directors, who, in turn, elect the officers who manage the business. In <sup>a</sup> small firm, the largest shareholders usually serves as a president and chairperson of the board. Also, Common Shareholders often



have the right, called the preemptive right, to purchase any additional shares sold by the firm.

3. Type of common stock  $\swarrow$  Class B stock  $\approx$  founders' shares  
Class A stock  
(Sold to the public and pay dividends), but no voting rights for 5 yrs)

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4. Common Stocks are expected to provide a stream of future flows, and a stock's value is founded by the same way as the values of other financial assets—namely, as the present value of its expected future cash flow stream.

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(Some formulas)  $\rightarrow$  "Homework?"

① Dividend yield =  $\frac{D_1}{P_0} = \frac{D_0(1+g)}{P_0}$

- ② If a firm/company earns a constant return on its equity and plows back a constant proportion of earnings, then growth rate,  $g$ ,

$$g = \left( \frac{\text{earnings} - \text{dividends}}{\text{earnings}} \right) \times \text{ROE} = (1 - \text{payout}) \times \text{ROE}$$

$D_0$  = the most recent dividend  
 $D_1$  = the first dividend expected  
 $D_t$  = expected dividend at the end of year  $t$   
 $P_0$  = actual market price of stock today  
 $g$  = expected growth rate.  
 $r_s$  = required rate of return

$$\text{Payout Ratio} = \frac{\text{dividend/share}}{\text{earnings/share}} = \frac{\text{DPS}}{\text{EPS}}$$

③ Constant growth =  $P_0 = \frac{D_1}{r_s - g} = \frac{D_0(1+g)}{r_s - g}$   
(Gordon model)

④ Capital gains yield =  $\frac{P_1 - P_0}{P_0}$

ex) If the Stock sells for \$10 today and its expected price is \$10.50 at the end of one year, then the expected capital gain; would be  $0,05 = 5\% = \frac{10,5 - 10}{10}$

⑤ expected total return =  $\frac{D_1}{P_0} + g$   
(expected rate of return on a Constant Growth Stock)



$$DDM = \hat{P}_0 = \frac{D_1}{(1+r_s)^1} + \frac{D_2}{(1+r_s)^2} + \dots + \frac{D_\infty}{(1+r_s)^\infty}$$

### Chapter 9 Stocks and Their Valuation

October 11, 2018.

1. If  $D_1 = \$2.00$ ,  $g = 6\%$ , and  $P_0 = \$40$ , what are the stock's 1) expected dividend yield, 2) capital gains yield, and 3) total expected return for the coming year?

$$1) \text{ expected dividend yield} = \frac{D_1}{P_0} = \frac{2}{40} = \frac{1}{20} = 0.05 = 5\%$$

$$2) \text{ expected capital gains yield} = \frac{P_0(1+g) - P_0}{P_0} = \frac{P_1 - P_0}{P_0} = 0.06 = 6\%$$

$$3) \text{ expected total return} = \frac{D_1}{P_0} + g = 5\% + 6\% = 11\%$$

2. Firm A is expected to pay a dividend of \$1 at the end of the year. The required rate of return is  $r_s = 11\%$ . Other things held constant, what would the stock's price be if the growth rate was 5%?

$$P_0 = \frac{D_1}{r_s - g} = \frac{\$1}{11\% - 5\%} = \$16.67$$

3. Firm A is expected to pay a dividend of \$1 at the end of the year. The required rate of return is  $r_s = 11\%$ . Other things held constant, what would the stock's price be if the growth rate was 0%? (Zero-growth stock)

$$\text{Constant growth} = P_0 = \frac{D_1}{r_s - g} = \$9.09$$

(Gordon model)

$$\text{Payout ratio} = \frac{\text{Dividends}}{\text{Net Income}} = \frac{(\text{Yearly}) \text{ Dividend per Share}}{\text{Earnings per Share}} = \frac{\text{DPS}}{\text{EPS}}$$

4. Firm B has a 12% ROE. Other things held constant, what would its expected growth rate be if it paid out 25% of its earnings as dividends?

$$g = (1 - \text{Payout}) \times \text{ROE} = 0.09 = 9\%$$

If a firm earns a constant return on its equity and plows back a

constant proportion of earnings, then growth rate  $g = \left( \frac{\text{earnings} - \text{dividends}}{\text{earnings}} \right) \cdot \text{ROE}$

5. What would its expected growth rate be if it paid out 75% of its earnings as dividends?

$$g = (1 - \text{Payout}) \times \text{ROE} = 0.03 = 3\%$$

$$= \frac{\text{earnings} - \text{dividends}}{\text{earnings}} \cdot \text{ROE}$$

$$6. V_p = D_p / r_p = \$10 / 10.30\% = \$97.09$$

$$7. \frac{4.5}{65} = 6.92\%$$

$$65 = \frac{\text{PMT}}{\text{Interest}}$$



## Stocks, Stock Valuation, and Stock Market Equilibrium

Like all financial assets, the value of a stock is estimated by finding the present value of a stream of expected future cash flows.

1. Discounted Dividend Model (DDM) ; when an investor purchases a share of stock, he/she typically expects to receive cash in the form of dividends and then, eventually, to sell the stock and to receive cash from the sale. In addition, the price any investor receives is dependent upon the dividends the next investor expects to earn, and so on for different generations of investors. Following this notion, the basic dividend valuation model is;

value of stock =  $\hat{P}_0$  = PV of expected future dividends

The dividend stream theoretically extends on out forever ( $D_1 \rightarrow D_\infty$ ). It would not be feasible to deal with an infinite stream of dividends, but if we assume that the dividend will grow forever at a constant rate, we can use the

$$\left. \begin{array}{l} \text{The dividend stream theoretically} \\ \text{extends on out forever } (D_1 \rightarrow D_\infty). \\ \text{It would not be feasible to deal} \\ \text{with an infinite stream of dividends,} \\ \text{but if we assume that the dividend} \\ \text{will grow forever at a constant rate;} \\ \text{we can use the} \end{array} \right\} = \frac{D_1}{(1+r_s)^1} + \frac{D_2}{(1+r_s)^2} + \dots + \frac{D_\infty}{(1+r_s)^\infty} = \sum_{t=1}^{\infty} \frac{D_t}{(1+r_s)^t}$$

2. Constant Growth Model AKA Gordon Model

$$= \left[ \frac{D_1}{(r_s - g)} \right] \leftarrow (r_s > g) \text{ must and why?}$$

2. Constant Growth Model; Gordon Model

$$P_0 = \frac{D_0(1+g)^1}{(1+r_s)^1} + \frac{D_0(1+g)^2}{(1+r_s)^2} + \dots + \frac{D_0(1+g)^\infty}{(1+r_s)^\infty}$$

$$= D_0 \cdot \sum_{t=1}^{\infty} \frac{(1+g)^t}{(1+r_s)^t}$$

$$= \frac{D_0(1+g)}{r_s - g} = \frac{D_1}{r_s - g}$$



## Non-Constant Growth Stocks (Supernormal Growth Stocks)

In real world, it is unreasonable to assume a constant growth rate for corporations. In this condition, we need to know how to estimate a short-run non-constant growth rate, then assume that after a certain point of time the firms will grow at a constant rate, and estimate that constant long-run growth rate.

Case 1)

A company just paid a \$1.15 dividend, and it is expected to grow at 30% for the next 3 years.

After 3 years the dividend is expected to grow at the rate of 8% indefinitely.

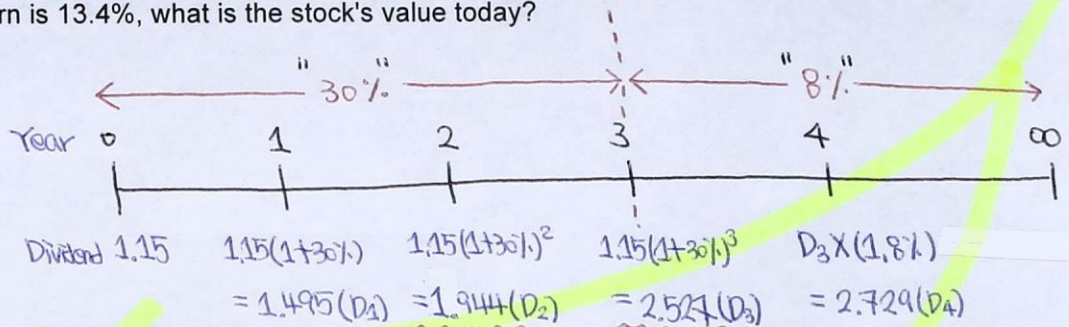
If the required return is 13.4%, what is the stock's value today?

$$D_0 = \$1.15$$

$$g_3 = 30\%$$

$$g_{\infty} = 8\%$$

$$r_s = 13.4\%$$



$$\textcircled{1} \$1.318 = \frac{1.495}{(1+13.4\%)}$$

$$\textcircled{2} \$1.511 = \frac{1.944}{(1+13.4\%)^2}$$

$$\textcircled{3} \$1.733 = \frac{2.527}{(1+13.4\%)^3}$$

**Discounting!!**

We can use the constant growth formula since the stock becomes a constant growth stock

$$\textcircled{1} + \textcircled{2} + \textcircled{3} = \text{PV of non-constant dividends}$$

$$\textcircled{4} = \text{PV of [intrinsic value at time } \infty \text{ (horizon value or terminal value)]}$$

$$P_3 = \frac{D_4}{r_s - g} = \frac{2.729}{13.4\% - 8\%}$$

$$= 50.531 (P_3)$$

$$\textcircled{4} \$34.651 = \frac{50.531}{(1+13.4\%)^3}$$

$$P_0 = 1.318 + 1.511 + 1.733 + 34.651$$

$$= \$39.213$$

Sum of all cash flows  
① ~ ④



Case 2)

A company just paid a \$1.55 dividend, and it is expected to grow at 22% for the next 4 years. After 4 years the dividend is expected to grow at the rate of 7.4% indefinitely.

If the required return is 17.4%, what is the stock's value today?