



Stock Valuation

Why do stocks have value?

- Why are people willing to pay money for stocks, and how can we determine their worth?
- A few facts:
 - Some companies do not give dividends
 - Some companies do not have positive earnings
- We will first look at stocks under certainty to answer this question

Stocks

Stocks are a claim on the value of a firm in excess of cash owed lenders.

How can we determine the price of a stock?

Two sources of cash flows:

- Dividends
- Capital gains

Two possibilities for valuing a stock

An investor who holds the stock for one year will expect to receive a return of

$$r = \frac{Div_1 + (P_1 - P_0)}{P_0}$$

Thus, the investor would expect to pay

$$P_0 = \frac{Div_1 + P_1}{1 + r}$$

Valuing Stock, Method II

But, an investor who holds the stock an infinite time would value the stock at the PV of the dividend stream:

$$P_0 = \frac{Div_1}{(1+r)} + \frac{Div_2}{(1+r)^2} + \frac{Div_3}{(1+r)^3} + \frac{Div_4}{(1+r)^4} + \dots$$

Who is correct? Answer: Both are.

In period 1, we can write:

$$P_1 = \frac{Div_2 + P_2}{1+r}$$

substituting this into our original equation for the price we obtain

$$P_0 = \frac{Div_1 + \frac{Div_2 + P_2}{1+r}}{1+r}$$

$$P_0 = \frac{Div_1}{1+r} + \frac{Div_2 + P_2}{(1+r)^2}$$

Zero Growth Firms (Cash Cows)

Consider a firm that pays all of its earnings per share (EPS) as dividends. The firm will not grow.

The price of a share is

$$P_0 = \frac{Div}{r}$$

Utilities are a good example of this type of firm.

Constant Growth Firms

Firms may retain some of their earnings if they have growth opportunities.

Suppose that the dividends start at Div and grow at rate g . The price of this stock is then

$$P_0 = \frac{Div}{r - g}$$

Estimation of Parameters

Growth rate g :

$g = \text{Retention Ratio} \times \text{Return on retained earnings}$

ROE is estimated from historical data

Retention ratio is obtained from the balance sheet.

r can be estimated from recalling the growing perpetuity price of the stock and solving for r :

$$P_0 = \frac{Div}{r - g} \Rightarrow r = \frac{Div}{P_0} + g$$

An intermediate case:

One other way to think about the firm's value is to start with the cash cow firm:

$$P_0 = \frac{EPS}{r}$$

If the firm can find a positive NPV project (evaluated at rate r), its new price will be

$$P_0 = \frac{EPS}{r} + NPVGO$$

Example

A firm generates an earnings per share (EPS) of \$5 currently. It will retain 40% of its earnings, thus the first dividend is \$3. The firm will earn a ROE of 20% on the retained earnings, and its current cost of capital (r) is 12%.

$$g = \text{ROE} \times \text{retention ratio} = .2 \times .4 = 8\%$$

$$\text{Its share price would be } \frac{\$3}{0.12 - 0.08} = \frac{\$3}{0.04} = \$75$$

Without the growth opportunity the stock would be worth

$$\frac{\$5}{0.12} = \$41.76$$

Example (continued)

The difference (\$33.33) is the NPVGO

What if this company could only obtain a ROE of 12% (its current cost of capital), but still retained 40% of earnings? $g = 0.12 \times 0.4 = 4.8\%$ And using this in our previous equation for growth

$$P = \frac{\$3}{0.12 - 0.048} = \$41.67$$