Gordon Growth Model (Continued)

Determining Dividend Growth Rates

How does the cash make its way from earnings into dividends?

Terminology

- **Book equity per share (BE):** replacement cost (per share) of productive capacity.
- **Return on equity (ROE):** cash flow generated by capital, net of maintaining productive capacity, as a percentage of BE.
- **Earnings per share (EPS):** cash flow (per share) generated by capital, net of maintaining productive capacity.

$$EPS_t = ROE \times BE_{t-1}$$

Retained Earnings and Dividends

Terminology

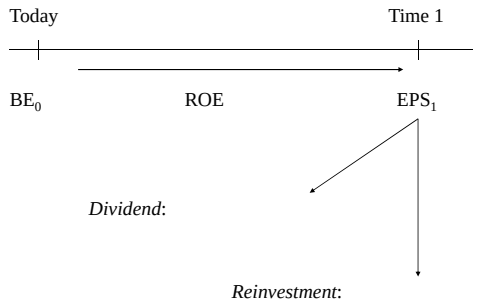
- **Plowback Ratio (b):** The fraction of earnings that is retained.
- **Payout Ratio (1-b):** The fraction of earnings that is paid out as a dividend.

$$\text{Payout Ratio} = 1 - b$$
$$\text{Div}_t = \text{EPS}_t \times (1 - b)$$

Example: Consider a firm with BE_0 = \$50, return on equity of 10%, and a plowback ratio of 0.5. What is BE_1?

- EPS_1 is based on *last* year's BE_0 and ROE
- The reinvestment is the part of the EPS_1 that is plowed back into the firm (b=50%)
- Thus the book equity BE_1 (after reinvestment) will be \$52.5
- The growth rate is:

So what did we do…



Determining Growth Rates

Growth in BE:

$$\text{BE}_t - \text{BE}_{t-1} = \text{EPS}_t \times \text{b} = \text{BE}_{t-1} \times \text{ROE} \times \text{b}$$
$$\Rightarrow \frac{\text{BE}_t - \text{BE}_{t-1}}{\text{BE}_{t-1}} = \text{ROE} \times \text{b}$$

Growth in EPS

$$\text{EPS}_t = \text{BE}_{t-1} \times \text{ROE} \Rightarrow \frac{\text{EPS}_t - \text{EPS}_{t-1}}{\text{EPS}_{t-1}} = \text{ROE} \times \text{b}$$

Growth in Dividends

$$\text{DIV}_t = (1-\text{b}) \times \text{EPS}_t \Rightarrow \frac{\text{DIV}_t - \text{DIV}_{t-1}}{\text{DIV}_{t-1}} = \text{ROE} \times \text{b}$$

$$\boxed{g = \text{ROE} \times \text{b}}$$

So…does the plowback ratio matter?

Example 1: Firm A has an ROE of 5% , current BE = $20/share, its cost of capital is r=5%. What is current share price if the plowback ratio is b=0, b=0.5.

- b=0
- b=0.5

Example 2: Firm A has an ROE of 5% , current BE = $20/share, its cost of capital is r=7%. What is current share price if the plowback ratio is b=0, b=0.5.

- b=0
- b=0.5
- Why are prices different?

Do we earn higher returns on "better" firms' equity?

Example: Firm A has an ROE of 5%. Its current BE = $20/share, its cost of capital is r=8%, and its plowback ratio is b=0.

- What dividend do you expect to receive in one year?
- What is the current share price?
- What is the expected price next year?
- What capital gain and total return will you earn from investing in this firm?

Example (continued): Firm B is as Firm A (ROE of 5%, current BE = $20/share, , cost of capital r=8%) with plowback ratio of b=0.5.

- What dividend do you expect to receive in one year?
- What is the current share price?
- What is the expected price next year?
- What is the capital gain and total return?

Firm A is making better financial decisions by choosing plowback ratio of 0. Investors know this and are willing to pay more for equity of Firm A but the return they receive on their investment is the same.