

Corporate Finance, Module 3: "The Value of Common Stocks" (Chapter 4)

*Intuition: Present Value of Growth Opportunities*

(The attached PDF file has better formatting.)

*Question:* The dividend growth rate is the return on equity times the plow-back ratio. Is the return on equity in the dividend growth model the return on market equity or the return on book equity?

*Answer:* Let's examine what happens if we use the return on market equity. Suppose a stock stands now at \$300 and has a 10% dividend yield, defined as next year's dividend divided by the current price:  $DIV_1 / P_0$ . Earnings next year will be \$50.

- A. What is next year's dividend?
- B. What is the payout ratio?
- C. What is the plow-back ratio?
- D. What is the return on equity?
- E. What is the dividend growth rate?
- F. What is the capitalization rate for this stock?
- G. What is the present value of growth opportunities?

*Question:* This is not difficult; we solve the problem as follows.

*Part A:* Next year's dividend is  $\$300 \times 10\% = \$30$ .

*Part B:* The payout ratio is  $\$30 / \$50 = 60\%$ .

*Part C:* The plow-back ratio is  $1 - 60\% = 40\%$ .

*Part D:* The return on equity is  $\$50 / \$300 = 1/6 \approx 16.67\%$ . (This is Jacob's error; by using the market value of equity instead of the book value of equity, the result is meaningless.)

*Part E:* The dividend growth rate is  $16.67\% \times 40\% = 6.67\%$ .

*Part F:*  $\$300 = \$30 / (k - 6.67\%) \Rightarrow k = 16.67\%$ .

*Part G:* If the all earnings were paid out as dividends, the stock price would be  $\$50 / 16.67\% = \$300.00$ . The present value of growth opportunities is zero.

*Answer:* Suppose we change the problem to:

"A stock stands now at **\$200** and has a 10% dividend yield, defined as next year's dividend divided by the current price:  $DIV_1 / P_0$ . Earnings next year will be \$50."

- A. What is next year's dividend?
- B. What is the payout ratio?
- C. What is the plow-back ratio?
- D. What is the return on equity?
- E. What is the dividend growth rate?
- F. What is the capitalization rate for this stock?
- G. What is the present value of growth opportunities?

*Question:* The only difference is the stock price; we solve the problem as follows:

*Part A:* Next year's dividend is  $\$200 \times 10\% = \$20$ .

*Part B:* The payout ratio is  $\$20 / \$50 = 40\%$ .

*Part C:* The plow-back ratio is  $1 - 40\% = 60\%$ .

*Part D:* The return on equity is  $\$50 / \$200 = \frac{1}{4} = 25\%$ .

*Part E:* The dividend growth rate is  $25\% \times 60\% = 15\%$ .

*Part F:*  $\$200 = \$20 / (k - 15\%) \Rightarrow k = 25\%$ .

*Part G:* If the all earnings were paid out as dividends, the stock price would be  $\$50 / 25\% = \$200.00$ . The present value of growth opportunities is zero.

*Question:* This seems strange; we changed the stock price but there is no change to the present value of growth opportunities.

*Answer:* The return on market equity is the capitalization rate for the stock. If we use the return on market equity instead of the return on book equity, the capitalization rate just equals the return on equity and the present value of growth opportunities is zero. That's not the intention. Rather, the return on equity is the return on book equity, and the difference between the market value of equity and the book value of equity reflects the present value of growth opportunities.

*Question:* What is the mistake in Part D? Isn't the return on an asset equal to the income divided by the initial price?

*Answer:* The formula means return on book equity, not return on market equity. The return on market equity is the market capitalization rate.

*Question:* Does return on equity normally mean return on book equity or return on market equity?

*Answer:* The meaning depends on the context. Brealey and Myers try to state explicitly which they mean.

*Question:* What is book equity and what is market value (market equity)?

*Answer:* Book equity is the assets on the balance sheet minus the liabilities on the balance sheet. It is an accounting item. It does not change by movements in the stock price of the firm's shares.

Market value is the number of share times the stock price. If investors think the firm is doing better, they may bid up the stock price. The market value increases, but the book equity does not change.

The difference between market value and book equity is the present value of future growth opportunities.