

## Earnings Growth and Stock Returns

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MANY INVESTORS AND FINANCIAL COMMENTATORS BELIEVE that high earnings growth rates and high rates of return are synonymous. This is false. What is true is that differences in earnings growth rates influence the breakdown of expected rates of return into their capital gain and dividend components. All else equal, a higher rate of earnings growth produces relatively more capital appreciation and less dividend yield. But earnings growth does not affect expected *total* rates of return (which are sums of expected price appreciation and dividend yield). Expected returns are determined by risk alone, and the greater the risk, the higher the expected rate of return.

The dividend discount model (or DDM) provides a framework for thinking about these matters. The DDM states that today's price of a share of stock equals the present value of all expected future dividends. Assuming that earnings are expected to grow at a constant rate forever and dividends are a fixed fraction of earnings, the dividend discount model can be expressed as follows:

$$(1) \quad P_t = \frac{dE_{t+1}}{r-g} .$$

In this equation,

$P_t$  = price per share today at time  $t$ ;

$E_{t+1}$  = expected earnings per share (EPS) next year at time  $t+1$ ;

$d$  = the constant fraction of earnings paid as cash dividends (i.e., the "payout ratio");

$r$  = the expected rate of return of the stock;

$g$  = the expected long-run, perpetual rate of earnings growth.<sup>1</sup>

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<sup>1</sup> The long-run earnings growth rate ( $g$ ) must be less than the expected rate of return ( $r$ ) or the share price will be infinite. The DDM can be adapted to deal with temporary bursts of earnings growth that exceed the expected rate of return. However, such extraordinary growth must eventually slow to a sustainable rate that is less than the expected rate of return.

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To illustrate, for company *A*, next year's expected EPS is \$5, its payout ratio is 80 percent, its expected rate of return is 15 percent, and earnings are expected to grow by 5 percent per year forever. From the DDM, the price of a share of stock *A* is \$40.<sup>2</sup>

Company *B* is an exact replica of company *A*, but its earnings are expected to grow faster. For *B*, next year's expected EPS is \$5, its payout ratio is 20 percent, and its expected earnings growth rate is 10 percent per year forever. Assuming that the earnings streams of companies *A* and *B* are subject to identical risks, the expected return of stock *B* must equal the 15 percent expected return of stock *A*.<sup>3</sup> Given this information, today's share price of *B* is \$20.<sup>4</sup>

The DDM indicates that earnings growth affects the current price of a share of stock. All else the same, the higher the expected earnings growth rate, the higher the current price per share.

The DDM can be used to project share prices, earnings, dividends and annual returns into the future (Table 1). For company *A*, share price, earnings and dividends grow at 5 percent. Company *A*'s total return, composed of a 10 percent

Table 1

### Projections of Share Prices, Earnings and Dividends for Stocks A and B

	Stock A	Year	Price A	EPS A	Dividend A	Dividend Yield	Capital Gain	Total Return A
Expected EPS ( $E_{t+1}$ )	\$5.00	0	\$40.00					
Payout ratio (d)	80%	1	\$42.00	\$5.00	\$4.00	10%	5%	15%
Growth rate (g)	5%	2	\$44.10	\$5.25	\$4.20	10%	5%	15%
Expected Return (r)	15%	3	\$46.31	\$5.51	\$4.41	10%	5%	15%
		4	\$48.62	\$5.79	\$4.63	10%	5%	15%
		5	\$51.05	\$6.08	\$4.86	10%	5%	15%
		6		\$6.38	\$5.11			

  

	Stock B	Year	Price B	EPS B	Dividend B	Dividend Yield	Capital Gain	Total Return B
Expected EPS ( $E_{t+1}$ )	\$5.00	0	\$20.00					
Payout ratio (d)	20%	1	\$22.00	\$5.00	\$1.00	5%	10%	15%
Growth rate (g)	10%	2	\$24.20	\$5.50	\$1.10	5%	10%	15%
Expected Return (r)	15%	3	\$26.62	\$6.05	\$1.21	5%	10%	15%
		4	\$29.28	\$6.66	\$1.33	5%	10%	15%
		5	\$32.21	\$7.32	\$1.46	5%	10%	15%
		6		\$8.05	\$1.61			

<sup>2</sup>The price of an *A* share equals .8 times \$5 divided by .1.

<sup>3</sup>Suppose that the expected return of *B* is 16 percent and that of *A* is 15 percent. If the risk characteristics of *A* and *B* are identical, investors can sell *A*, buy *B* and obtain a higher expected return for the same level of risk. The selling of *A* will reduce its price and increase its expected return. The buying of *B* will increase its price and lower its expected return. Trading will continue until the expected rates of return of the two stocks are equal.

<sup>4</sup>The price of a *B* share equals .2 times \$5 divided by .05.

dividend yield and a 5 percent rate of capital appreciation, is 15 percent. For company *B*, share price, earnings and dividends grow at 10 percent. Company *B*'s total return of 15 percent is made up of a 5 percent dividend yield and 10 percent capital gains.

So far, knowledge of the expected rate of return has been assumed. But expected rates of return are not observable and are difficult to forecast accurately. What can be observed are share prices. Using forecasts of next year's earnings, the payout ratio and a firm's long-run earnings growth rate, the DDM pricing equation (1) can be rearranged to solve for the expected rate of return:

$$(2) \quad r = \frac{dE_{t+1}}{P_t} + g.$$

At first glance, equation (2) appears to refute the assertion that expected return and earnings growth are unrelated. It seems to indicate that, given the dividend yield, the higher the growth rate, the higher the expected rate of return. But this is not a correct interpretation of equation (2). What equation (2) shows is the decomposition of the market-determined expected total rate of return into the portion that is dividend yield ( $\frac{dE_{t+1}}{P_t}$ ) and the portion that is capital appreciation ( $g$ ).

If investors are indifferent between a dollar of dividends and a dollar of capital gains, financial markets will determine share prices that equate expected *total* rates of return for identical risks. The breakdown of the total return into its dividend and capital gains components is irrelevant.<sup>5</sup> As seen in Table 1, the earnings growth rate determines the rate of capital appreciation. Company *A* has a dividend yield of 10 percent and 5 percent capital gains. Company *B* has a dividend yield of 5 percent and 10 percent capital gains. *B*, with higher earnings growth, has more capital appreciation and less dividend yield than *A*, but the expected total returns of *A* and *B* must both be 15 percent because their risks are identical.

On March 7, 2000, the price of Procter & Gamble shares fell 31 percent on a surprise announcement that earnings would be much lower than previously anticipated. Referring to equation (1), the DDM indicates that share prices should react to earnings revisions. For example, given an expected return of 15 percent, the price of *B* is \$20 initially when next year's expected EPS is \$5, the payout ratio is 20 percent, and the expected earnings growth rate is 10 percent. If new information causes a reduction in the expected earnings growth rate to 7.5 percent (while next year's expected EPS and the payout ratio remain constant), the price of *B* must drop by 33 percent to \$13.33 to maintain the equilibrium 15 percent expected rate of return. (*B*'s price also will drop to \$13.33 if next year's expected EPS is revised downward to \$3.33 while the expected earnings growth rate remains 10 percent and the payout ratio remains 20 percent.)<sup>6</sup>

<sup>5</sup>Miller, Merton H. and Franco Modigliani. "Dividend Policy, Growth, and the Valuation of Shares," *Journal of Business* XXXIV, No. 4 (Oct. 1961), pp. 411-33.

<sup>6</sup>The price of a *B* share will equal \$13.33 if the expected growth rate is marked down to 7.5 percent: .2 times \$5 divided by .075. It also will equal \$13.33 if next-year's earnings are revised downward to \$3.33: .2 times \$3.33 divided by .05.

**Conclusions**

- Earnings growth does not affect expected total rates of return. Expected returns are determined by risk, and the greater the risk, the higher the expected rate of return.
- For a given expected total rate of return, the earnings growth rate determines the breakdown of total returns into dividend yield and capital gains. All else the same, a higher earnings growth rate results in more capital appreciation and less dividend yield.
- Share prices will react to revisions of earnings forecasts. Reductions in forecasts of near-term earnings or long-term earnings growth rates reduce share prices. Increases in predictions of near-term earnings or long-term earnings growth rates increase share prices.