MIT Sloan School of Management

J. Wang
E52-435

Finance Theory 15.415
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Solution to Assignment 3: Valuation of Common Stocks

Due: March 4 (Thursday), 1999

1. 'The Economist' on the US Stock Market

(a) From the constant growth formula, we get $P_0 = \frac{D_1}{r-g}$.

$$r = \frac{D_1}{P_0} + g.$$

We also know that $D_1 = D_0(1+g)$. Making this substitution, and simplifying, we get that:

$$g = \frac{r - D_0/P_0}{1 + D_0/P_0}.$$

The article tells us that r is 9%. It also tells us that current dividends are 1.6% of stock market capitalization, i.e. $D_0/P_0 = 1.6\%$. This equation implies that $g = 7.28\%$, which is close to the 7.5% reported in the article.

(b) Using the PVGO formula, $P_0 = \frac{EPS_1}{r} + PVGO$, we get

$$\frac{PVGO}{P_0} = 1 - \frac{EPS_1}{rP_0}.$$

We can rewrite this equation as

$$\frac{PVGO}{P_0} = 1 - \frac{EPS_1}{EPS_0} \times \frac{1}{r} \times \frac{EPS_0}{P_0}.$$

Since expected earnings are expected to grow by 6%, $EPS_1/EPS_0 = 1.06$. Moreover, from the *WSJ*, the P/E ratio is 23, implying that $EPS_0/P_0 = 1/23$. Substituting in the equation above, and setting $r = 9\%$, we get

$$\frac{PVGO}{P_0} = 48.8\%.$$

2. One Day in the Life of a Stock Analyst

Restating the relevant data that is used:

Company Name	D_1	Historical Growth (Div)	Historical Growth (ROE)	Forecasted Growth	r
Duke Energy	2.29	4.36%	4%	4%	9.50%
Anheuser Busch	1.13	11.52%	14%	8.4%	10.25%

Prices using the constant dividend-growth formula:

	Prices based on			
Company Name	Historical Growth (Div)	Historical Growth (ROE)	Forecasted Growth	Actual Price
Duke Energy	$44\frac{3}{4}$	$41\frac{10}{16}$	$41\frac{10}{16}$	$49\frac{15}{16}$
Anheuser Busch	N/A	N/A	$61\frac{1}{16}$	$45\frac{15}{16}$