

# RAGAN ENGINE

## Stock Analysis

FIN 518 (Fall 2018)

## STOCK VALUATION AT RAGAN ENGINES

### 1. Value of Ragan Engine stock

To calculate Ragan Engine's (RE) stock value, its growth rate (g) and Dividend at year 0 ( $Div_0$ ) needed to be computed.  $g = \text{retention ratio} \times \text{ROE}$

Retention ratio is the portion of the net income which the organization keeps.

$$\text{For RE, net income of year 0 was } 5.35 \times 150000 \times 2 = 1605000$$

$$\text{Total dividend paid to the shareholders was } 32000 \times 2 = 640000$$

$$\text{retention ratio} = (1605000 - 640000) / 1605000 = 0.6012$$

$$\text{Growth ratio} = 0.6012 \times 0.21 = 0.1263$$

$$Div_0 = 320000 \times 2 / 150000 \times 2 = 2.1333 \dots$$

$$Div_1 = Div_0 \times (1 + g) = 2.1333 \dots \times (1 + 0.1263) = 2.4027$$

$$P_0 = Div_1 / (R - g) = 2.4027 / (0.18 - 0.1263) = 45.0788$$

RE's stock value was determined at \$45.08 per share.

### 2. The value of the stock with the average industry rate after 5 years

To calculate the stock with the average industry rate, we must use several formulas; PV of a growing annuity and perpetuity formula

The PV of a growing annuity will be used to calculate the first 5 years whilst the perpetuity will be used to calculate the final year using the industry growth rate ( $g_2$ ), rate, and years (T).

Years	0	1	2	3	4	5	6
Dividend	2.13	\$2.40	3.05	4.35	7.01	12.70	13.26

The formula and calculation for the value of the stock with the average industry rate is depicted below:

$$\text{PV of growing annuity} = D_0 / (R - g_1) \times 1 - ((1 + g_1)^T / (1 + r)^T)$$

$$\text{Perpetuity} = (D_6 / R - g_2) / ((1 + r)^5)$$

$$\text{PV of growing annuity} = (2.13 / .15 - .1281) \times 1 - ((1 + .1281)^5 / (1 + .15)^5) = 8.914804$$

$$\text{Perpetuity} = (13.5117 / .15 - .0402) / (1 + .15)^5 = 61.18133$$

To find the average price one must add the PV of growing annuity and perpetuity  
 $= 8.914804 + 61.18133 = \$70.09613$

**3. What is the industry average price–earnings ratio? What is Ragan’s price–earnings ratio? Comment on any differences and explain why they may exist.**

Price-Earnings Ratio (PE) equals to current price per share divided by annual earnings per share (EPS).

	EPS	Stock Price	PE
Industry Average	\$ 0.73	\$ 18.08	\$ 24.77
Ragan	\$ 5.35	\$ 39.70	\$ 7.42

*Sample calculation for Ragan:*

$$DPS = \text{dividends} / \text{shares outstanding} = 640000 / 300000 = 2.13$$

$$\text{earnings this year} = EPS * \text{shares outstanding} = 5.35 * 300000 = 1605000$$

$$\text{retention ratio} = \text{retained earnings this year} / \text{earnings this year} = (\text{earnings} - \text{div}) / \text{earnings} = (1605000 - 965000) / 1605000 = 60.12\%$$

$$g = \text{retention ratio} * ROE = 60.12\% * 21\% = 12.63\%$$

$$\text{price} = DPS / (\text{required return} - g) = 2.13 / (18\% - 12.63\%) = 39.70$$

$$PE = \text{price} / EPS = 39.70 / 5.35 = 7.42$$

Ragan’s PE is much lower than industry average PE. This may be surprising at the first look because Ragan has much higher EPS and stock price. We know that PE is positively related to growth opportunity and negatively related to risk, which is the required return “R”. Therefore, Ragan either have low growth opportunity and/or have higher risk than industry’s average. In the case of Ragan, it was indicated that they have experience rapid growth and their growth rate is higher than industry due to technology advantage. Hence, we should examine the risk of Ragan. The required return of industry’s average is 15% while Ragan has 18%. Thus, Ragan is assuming more risk than the industry. Hence, Ragan has a much lower PE. If Ragan has an expected return of 15%, they would have a higher stock price. In this case, they will have higher PE.

**4. Assume the company’s growth rate declines to the industry average after five years.**

### What percentage of the stock's value is attributable to growth opportunities?

To be able to calculate what percentage of the stock will be attributed to growth opportunities if the growth rate of Regan Engines drops from 12.63%, we need first to find out the industry growth. Having that the Industry Average ROE is 11% and an industry retention ratio is 39.7%, we use the following formula:

$$\text{Growth} = \text{Retention ratio} \times \text{ROE} = 4.37\%$$

This way we assume that after five years the growth rate will fall from 12.63% to 4.37%.

Years	0	1	2	3	4	5	6
Dividend		\$2.40	3.05	4.35	7.01	12.70	13.26
Growth Rate		12.63%	12.63%	12.63%	12.63%	12.63%	4.37%

Having said this we need the value of the stock with the average industry rate that was already calculated in question 2, \$70.9.

So, our new total stock value will be:

Stock Value:  $300.000 \times 70.9 = 21.271.188$  and therefore the **total earnings** having into consideration the industry average rate:  $\$5.35 \times (300.000/15\%) = 10.700.000$

Giving us that the percentage of the stock's value that will be attributed to growth is:

$$1 - (10.700.000 / 21.271.188) = \mathbf{49.7\%}$$

**5. Assume the company's growth rate slows to the industry average in five years. What future return on equity does this imply?**

Year	0	1	2	3	4	5	6
g	-	12.63%	12.63%	12.63%	12.63%	12.63%	4.37%
Div. paid	-	\$ 2.13	\$ 2.40	\$ 2.71	\$ 3.05	\$ 3.43	\$ 3.58
Retention	-	60.12%	60.12%	60.12%	60.12%	60.12%	60.12%
ROE	-	21.00%	21.00%	21.00%	21.00%	21.00%	7.27%

In order to calculate the new ROE after the 5 year drop of the growth rate, we need to find out what the new (industry) growth rate is. In order to calculate the growth rate we are going to use the given industry average values for DPS, EPS, ROE, which was explained in question 4. The industry average growth was found to be 4.37%.

Assuming that the retention ratio will remain the same, we are going to use the "1-DPS/EPS" formula to find the ratio, which will stay at the same value of 60.12%.

$$\text{Retention ratio} = 1 - (\text{DPS}/\text{EPS}) = 1 - (0.44/0.73) = 60.12\%$$

After finding the new industry growth rate and the retention ratio, we can now use the general formula to solve for the return on equity. Solving for ROE in the equation below will give us the new ROE to be 7.27%.

$$g = \text{retention ratio} \times \text{ROE} \implies \text{ROE} = g / \text{retention ratio} = 4.37\% / 60.12 = 7.27\%$$

**6. What steps can Carrington and Genevieve take to try and increase the price of the stock? Are there any conditions under which this strategy would not increase the stock price.**

Stock value is calculated by  $\frac{\text{dividend}}{R - \text{growth ratio}}$ .

The above formula suggests that the computed value is heavily dependent on the size of either the dividend or the value of the denominator ( $R - g$ ).

There are several ways to increase this value;

- increase the nominator (dividend)
- reduce denominator by applying smaller R
- reduce the denominator by applying higher g
- increase dividend and apply smaller R
- increase dividend and apply greater g
- increase dividend, apply smaller R, and increase g

The stock value computed in the question #1 used R of .18. The industry's average was estimated at .15. Any value between .15 and .18 will increase the *estimated* present value of RE's stock (e.g.,  $\frac{2.4027}{.165-.1267} = 62.73$  which is greater than 45.08)

Higher dividend should yield higher stock value. Increase in dividend leaves smaller amount of cash retained for the company which means the company has less resource to operate with.

Another way to increase stock value is to increase the g which is the product of retention ratio\*ROE. Therefore, by increasing either retention ratio, ROE, or both RE's stock value will rise. Reduction in dividend results in higher retention ratio. However, dividend is the nominator of the stock value formula, thus, significant decrease in dividend can offset the increase in the denominator and result in a value less than the original. Increase in ROE will not cause reduction in dividend, however, this is not easily accomplished. For the organization to increase ROE, there must be a good reason, such as rise in demand for their product/service. There are several reasons that can lead to higher demand, one of which is to expand market share. RE may expand its market share by producing superior goods. Beating the competition may require more invest into research and development. Increase in investment may reduce the dividend paid to the stock holders.

For example, RE reduces dividend down to \$343929 in total and compute stock value with an R = 16.5%. The value will be at \$23,818,037.40 per share. The RE will have additional \$296,071 which can be used in R&D. With an R = .15, the price will be \$89.04 per share and with the R less than .165 results in negative value.

The above scenarios will not be possible if one of the two disagrees to the reduced dividends or R falls below 16.5%.