



Discussion week 4

Introduction to finance and marketing for engineers

Week 4

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Ex 1

Valyrian Inc.'s Balance Sheet and Income Statement as of Dec 31st 2018 are given below. Company has a dividend payout ratio of 0.5 and has no plans of issuing new stock or repurchasing its existing stock in the near future. *Please choose one of the scenarios below to produce the pro-forma statements of Valyrian for 2019. Scenario A is easier. Scenario B has bonus points. Please do not answer both questions. If you answer both, we will grade only scenario B.*

Scenario A (25 points) Sales grow at 20%. Assets, accounts payable, NWC, COGS, SG&A costs grow at the same rate as sales. Annual depreciation cost stays the same. The conditions in the capital markets are such that short term borrowing is possible for any company but long term borrowing is available at a cost of 5% per year for those companies with a D/E less than 2 and at a cost of 10% for those with a D/E greater than 2. Produce the pro-forma income statement and balance sheet of Valyrian for Dec 31, 2019.



Ex 1

Scenario B (25 points plus 6 bonus points) Company uses only its internal funds to grow, no new long term debt will be obtained. That is, long term debt will stay the same. Assets, accounts payable, NWC, COGS, SG&A costs grow at the same rate as sales. Annual depreciation cost stays the same. The conditions in the capital markets are such that short term borrowing is possible for any company. Any existing long term debt has a cost of 5% interest per year for those companies with a D/E less than 2 and a cost of 10% interest for those with a D/E greater than 2. Produce the pro-forma income statement and balance sheet of Valyrian for Dec 31, 2019. What is the maximum rate Valyrian can grow at using only its internal sources?

Period Ending	12/31/2018
Current Assets	
Cash And Cash Equivalents	12,000
Account Receivables	1,400
Inventory	3,600
Total Current Assets	17,000
Long Term Investments	326,000
Net Property Plant and Equipment	278,000
Net Goodwill	151,000
Net Intangible Assets	57,000
Total Fixed Assets	812,000
Total Assets	829,000
Current Liabilities	
Accounts Payable	10,000
Notes Payable	2,000
Total Current Liabilities	12,000
Long Term Debt	526,000
Total Liabilities	538,000
Stockholders' Equity	
Common Stock	26,000
Capital Surplus	196,000
Treasury Stock	-4,500
Accumulated Retained Earnings	73,500
Total Stockholder Equity	291,000
Total Liabilites and Stockholders Equity	829,000

Revenue	12/31/2018
Total Revenue	200,000
COGS	80,000
Selling, Gen&Adm Costs	34,000
Depreciation	20,000
Earnings Before Interest and Taxes	66,000
Interest Expense	26300
Income Before Tax	39,700
Income Tax Expense(20%)	7940
Net Income	31,760

Sol 1

Period Ending	Scenario A	Scenario B
Current Assets		
Cash And Cash Equivalents	14,400	12,000(1+x)
Account Receivables	1,680	1,400(1+x)
Inventory	4,320	3,600(1+x)
Total Current Assets	20,400	17,000(1+x)
Long Term Investments	391,200	326,000(1+x)
Net Property Plant and Equipment	333,600	278,000(1+x)
Net Goodwill	181,200	151,000(1+x)
Net Intangible Assets	68,400	57,000(1+x)
Total Fixed Assets	974,400	812,000(1+x)
Total Assets	994,800	829,000(1+x)

To grow at 20%, the following equation needs to hold: $994,800 = 14,400 + 291,000 + D + \Delta RE$

Sol 1

Revenue	Scenario A	Scenario B
Total Revenue	240000	$200,000(1+x)$
COGS	96000	$80,000(1+x)$
Selling, Gen&Adm Costs	40800	$34,000(1+x)$
Depreciation	20,000	20,000
Earnings Before Interest and Taxes	83,200	$86,000(1+x)-20,000$
Interest Expense	68345.833	26,300
Income Before Tax	14,854	$86,000(1+x)-46,300$
Income Tax Expense(20%)	2,970.8	$0.20(86,000(1+x)-46,300)$
Net Income	11,883	$.80(86,000(1+x)-46,300)$
RE	5941.6667	$.40(86,000(1+x)-46,300)$

Sol 1

Current Liabilities		
Accounts Payable	12,000	10,000(1+x)
Notes Payable	2,400	2,000(1+x)
Total Current Liabilities	14,400	12,000(1+x)
Long Term Debt	683,458	526,000
Total Liabilities	697,858	526,000+12,000(1+x)
Stockholders' Equity		
Common Stock	26,000	26,000
Capital Surplus	196,000	196,000
Treasury Stock	-4,500	-4,500
Accumulated Retained Earnings	79,442	73,500+.40(86,000(1+x)-46,300)
Total Stockholder Equity	296,942	291,000+.4(86,000(1+x)-46,300)
Total Liabilities and Stockholders Equity	994,800	829,000(1+x)

Sol 1

Scenario

A

B

- Other calculations:

NWC	5,000	$(5000 \times 1.2) = 6000$	$(5000 \times (1+x)) = 5100$
D/E	1.848797251	2.350152948	1.749986995

Scenario

A

B

To grow at 20%, the following equation needs to hold:

$$994,800 = 14,400 + 291,000 + D + \Delta RE$$

$$\text{where } \Delta RE = 1/2(83,200 - .10D) \times 0.8$$

Then D =

689,400

33280

0.04

0.96

656,120

New Debt 683458.3333

Change in RE 5941.666667

$$829,000(1+x) = 526,000 + 12,000(1+x) + 291,000 + 0.4(86,000(1+x) - 46,300)$$

$$x = 0.02$$



Ex 2

A&W Co. has a 9% ROE, and 8% sustainable growth rate when Debt to Equity ratio is kept at 2/3.

What is the maximum growth rate A&W can achieve if A&W wants to use only its internal funds?

Sol 2

$$\text{Internal Growth Rate} = (\text{ROA} \times b) / (1 - \text{ROA} \times b)$$

We first need to find b , our retention ratio.

$$\text{Sustainable Growth Rate} = (\text{ROE} \times b) / (1 - \text{ROE} \times b)$$

$$0.08 = 0.09b / (1 - 0.09 \times b) \quad \rightarrow \quad 0.08(1 - 0.09b) = 0.09b \quad \rightarrow \quad 0.08 - 0.0072b = 0.09b$$

$$0.08 = 0.0972b \quad \rightarrow \quad b = 0.82$$

$$\text{ROA} = \text{Net Income} / \text{Assets}$$

$$\text{DfE} = \text{Debt} / \text{Equity} = (\text{Assets} - \text{Equity}) / \text{Equity} = \text{Assets} / \text{Equity} - 1$$

$$\text{EM} = \text{DfE} + 1 = \text{Assets} / \text{Equity}$$

$$\text{ROE} = \text{Net Income} / \text{Equity} = \text{Net Income} / \text{Assets} \times (\text{Assets} / \text{Equity})$$

$$0.09 = \text{ROA} \times \frac{2}{3} + 1 \quad \rightarrow \quad \text{ROA} = 0.054$$

$$\text{Internal Growth Rate} = 0.054 \times 0.82 / (1 - 0.054 \times 0.82)$$

$$\text{Internal Growth Rate} = 0.046 = 4.6\%$$



Ex 3

Suppose a firm calculates its external funding needs and finds that it is negative. What are the firm's options in this case?



Sol 3

With a negative external financing need, the firm has a surplus of funds that it can use to reduce current liabilities, reduce long-term debt, buy back common stock, or increase dividends.

If acceptable opportunities exist, firms might also use the extra funds to add assets.



Internal and sustainable growth

- The internal growth rate tells us how much the firm can grow assets using retained earnings as the only source of financing.

$$\text{Internal growth rate} = \frac{ROA * b}{1 - ROA * b}$$

- The sustainable growth rate tells us how much the firm can grow by using internally generated funds and issuing debt to maintain a constant debt ratio.

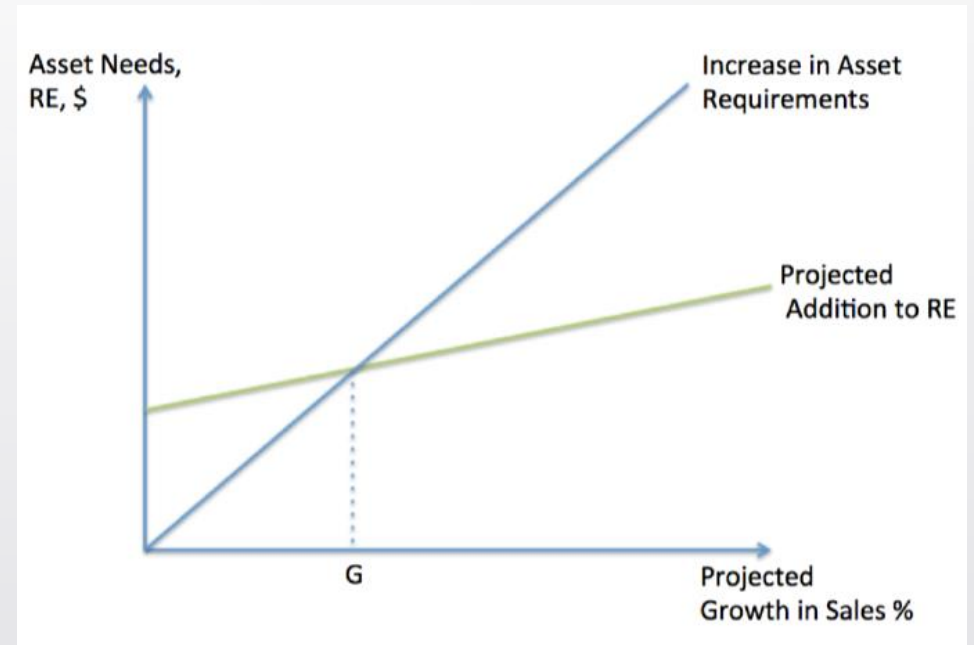
$$\text{Sustainable growth rate} = \frac{ROE * b}{1 - ROE * b}$$

Ex 4

In the above diagram, Furka, Inc.'s asset increase requirements in relation to its projected addition to retained earnings are given at each projected growth rate.

Financial objective: No new stocks will be issued. Dividend payout ratio will stay the same.

a. If the planned growth rate for next year is less than G , is it possible for Furka to have a lower D/E ratio next year compared to this year?





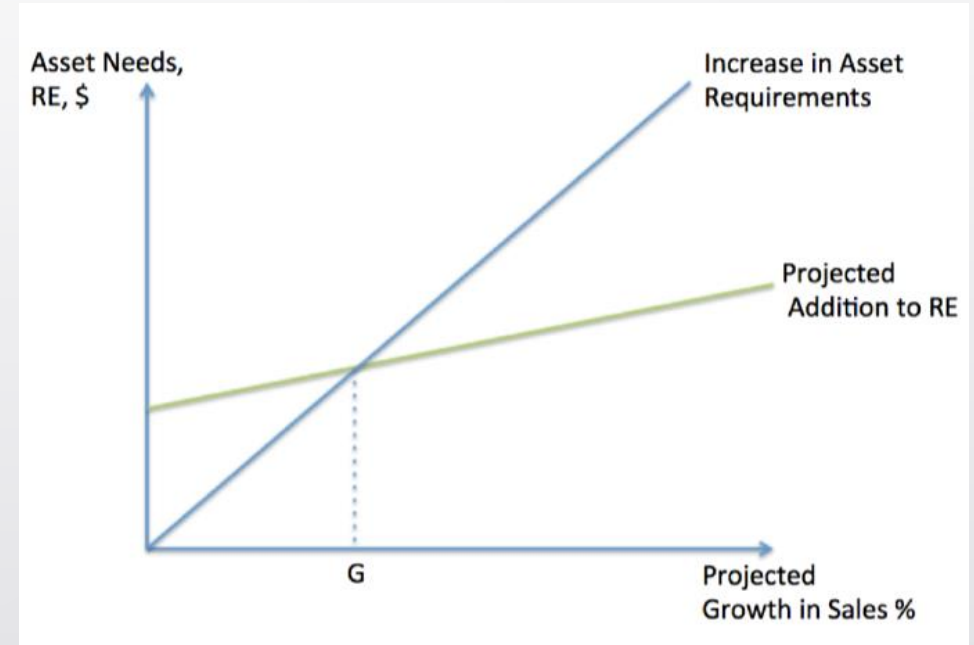
Sol 4

Yes, since at any growth level smaller than G , $EFN < 0$, which indicates surplus, and D/E can be obtained.

Ex 4

b. If planned growth rate is more than G , is it possible for Furka to keep its D/E ratio next year the same as this year?

Yes. Since sustainable growth rate is at least as high as internal growth rate, the rate at which D/E stays the same will be equal to or greater than G . (equal only if $D=0$)



Ex 4

c. If Furka plans to grow at rate G , is it possible to keep D/E ratio the same as this year?

If $D=0$, it is possible.

