

Business 2019

Assignment 2

Solutions

1. Consider the balance sheets and income statements for Sunrise, Inc. depicted in Table 1 and Table 2.

- (a) For year 2000, calculate Sunrise's cash flow from assets, the cash flow to creditors and the cash flow to shareholders.

Answer: Sunrise's operating cash flow (OCF) is given by

$$\begin{aligned}\text{OCF} &= \text{Net income} + \text{Interest} + \text{Depreciation} \\ &= \$1,105 + \$500 + \$350 \\ &= \$1,955.\end{aligned}$$

Net capital spending (NCS) is given by

$$\begin{aligned}\text{NCS} &= \text{NFA}_{2000} - \text{NFA}_{1999} + \text{Depreciation} \\ &= \$10,230 - \$10,007 + \$350 \\ &= \$573,\end{aligned}$$

where NFA_x denotes Net fixed assets at the end of year x . Change in net working capital, ΔNWC , is given by

$$\begin{aligned}\Delta\text{NWC} &= \text{NWC}_{2000} - \text{NWC}_{1999} \\ &= (\$6,228 - \$1,337) - (\$5,502 - \$1,290) \\ &= \$679.\end{aligned}$$

Hence cash flow from assets, $CF(A)$, is

$$CF(A) = OCF - NCS - \Delta NWC = \$1,955 - \$573 - \$679 = \$703.$$

Cash flow to shareholders, $CF(S)$, is

$$\begin{aligned} CF(S) &= \text{Dividends} + \text{Net shares repurchases} \\ &= \$474 + (-\$300) \\ &= \$174. \end{aligned}$$

Cash flow to bondholders, $CF(B)$, is

$$\begin{aligned} CF(B) &= \text{Interest} + \text{Net debt redeemed} \\ &= \$500 + \$29 \\ &= \$529. \end{aligned}$$

To check if these answers are right,

$$CF(S) + CF(B) = \$174 + \$529 = \$703 = CF(A).$$

- (b) Prepare Sunrise's 2000 statement of change in financial position. What were the main uses of cash in 2000?

Answer: The statement of change in financial position is depicted in Table 3. The main uses of cash in 2000 were, in descending order, the increase in inventory (\$1,330), net capital spending (\$573), dividends paid (\$474) and the increase in accounts receivable (\$420).

- (c) Prepare the common-size balance sheets for Sunrise in 1999 and 2000. What observations can you make from these balance sheets?

Answer: Refer to Table 4 for the common-size balance sheets. From these statements, we see a substantial decline in cash as a fraction of total assets and a substantial increase in inventory.

- (d) Prepare the common-size income statements for Sunrise in 1999 and 2000. What observations can you make from these income statements?

Answer: Refer to Table 5 for the common-size income statements. There is no significant change from 1999 to 2000.

- (e) Calculate, for both 1999 and 2000, Sunrise's (i) current ratio, (ii) quick ratio and (iii) cash ratio. What can you say from these ratios?

Answer: The current ratio was $\frac{5,502}{1,290} = 4.27$ in 1999 and $\frac{6,228}{1,337} = 4.67$ in 2000. The quick ratio was $\frac{5,502-2,200}{1,290} = 2.56$ in 1999 and $\frac{6,228-3,530}{1,337} = 2.02$ in 2000. The cash ratio was $\frac{2,099}{1,290} = 1.63$ in 1999 and $\frac{1,075}{1,337} = 0.80$ in 2000. Even though the current ratio is higher in 2000 than in 1999, Sunrise's short-term solvency seems to be declining.

- (f) Calculate, for both 1999 and 2000, Sunrise's (i) total debt ratio, (ii) debt/equity ratio, (iii) equity multiplier and (iv) long-term debt ratio. What can you say from these ratios?

Answer: The total debt ratio was $\frac{1,290+5,118}{15,509} = 0.41$ in 1999 and $\frac{1,337+5,089}{16,458} = 0.39$ in 2000. The debt/equity ratio was $\frac{1,290+5,118}{9,109} = 0.70$ in 1999 and $\frac{1,337+5,089}{10,032} = 0.64$ in 2000. The equity multiplier was $\frac{15,509}{9,109} = 1.70$ in 1999 and $\frac{16,458}{10,032} = 1.64$ in 2000. The long-term debt ratio was $\frac{5,118}{5,118+9,109} = 0.36$ in 1999 and $\frac{5,089}{5,089+10,032} = 0.34$ in 2000. These ratios are not significantly different between the two years.

- (g) Calculate, for both 1999 and 2000, Sunrise's (i) inventory turnover ratio, (ii) days' sales in inventory and (iii) asset turnover ratio. What can you say from these ratios?

Answer: Inventory turnover ratio was $\frac{3,600}{2,200} = 1.64$ times in 1999 and $\frac{3,900}{3,530} = 1.10$ times in 2000. Hence the days' sales in inventory was $\frac{365}{1.64} = 222.56$ days in 1999 and $\frac{365}{1.10} = 331.82$ days in 2000. Total asset turnover ratio was $\frac{7,000}{15,509} = 0.45$ times in 1999 and $\frac{7,700}{16,458} = 0.47$ times in 2000. We observe a significant increase in in days' sales in inventory.

- (h) Calculate, for both 1999 and 2000, Sunrise's (i) profit margin, (ii) return on assets

and (iii) return on equity. Derive the Du Pont identity for both years.

Answer: The profit margin was $\frac{1,040}{7,000} = 14.9\%$ in 1999 and $\frac{1,105}{7,500} = 14.6\%$ in 2000. The return on assets was $\frac{1,040}{15,509} = 6.7\%$ in 1999 and $\frac{1,105}{16,458} = 6.7\%$ in 2000. The return on equity was $\frac{1,040}{9,101} = 11.4\%$ in 1999 and $\frac{1,105}{10,032} = 11.0\%$ in 2000. The Du Pont identity is

$$\begin{aligned} \text{ROE} &= \text{Profit margin} \times \text{Total asset turnover} \times \text{Equity multiplier} \\ &= 14.9\% \times 45\% \times 1.7 \quad \text{in 1999} \\ &= 14.6\% \times 47\% \times 1.64 \quad \text{in 2000.} \end{aligned}$$

Hence the decline in the return on equity from 1999 to 2000 is attributable to the decline in profit margin and the decline in the equity multiplier.

2. The most recent financial statements for Rosegarten Corporation are shown in Table 6 and Table 7. Sales for 2001 are projected to grow by 25 percent. The tax rate and the dividend payout rate will remain constant. Costs, current assets and accounts payable increase in proportions with sales.

(a) If the firm is operating at full capacity and no new debt or equity is issued, what is the external financing needed to support the 25 percent growth rate?

Answer: When sales grow at the rate g , the increase in total assets (A) is Ag . On the right-hand side of the balance sheet, retained earnings increase by $(1+g)pSR$, where p denotes the profit margin, S denotes total sales and R denotes the retention ratio. Also, accounts payable (A/P) increase in proportions with S , i.e. the increase in A/P is $(A/P)g$. Hence if no new debt or equity is issued, the external financing needed to support a growth rate g is given by

$$\text{EFN} = Ag - (1+g)pSR - (A/P)g.$$

Here we have $A = 3,000$, $p = \frac{264}{2000} = 13.2\%$, $S = 2,000$, $R = \frac{176}{264} = \frac{2}{3}$ and

A/P = 300. This gives us

$$\begin{aligned}\text{EFN} &= 3,000g - (1 + g) \times .132 \times 2,000 \times \frac{2}{3} - 300g \\ &= 3,000g - (1 + g)176 - 300g \\ &= -176 + 2,524g.\end{aligned}$$

Hence if $g = 25\%$, EFN is equal to \$455.

- (b) Suppose now that the firm was operating at only 80 percent capacity in 2000. What is EFN now?

Answer: If the firm was operating at 80 percent of capacity in 2000, \$1,800 of net fixed assets can support up to $\frac{2,000}{.8} = \$2,500$ of sales. Hence there is no need for additional fixed assets if sales grow by 25%. Current assets will nevertheless grow with sales, and thus the increase in total assets is $1,200 \times 25\% = 300$. The changes in the right-hand side of the balance sheet are as in (a), i.e. it increases by \$295. Hence the external financing needed in this case is $300 - 295 = \$5$.

- (c) Assume the firm is operating at full capacity. If it wishes to keep a current ratio of at least 3 and a total debt ratio of at most 0.4, what is a possible financing plan?

Answer: Projected current assets are \$1,500 and projected accounts payable are \$375. Maintaining a current ratio of at least 3 means that

$$\frac{1,500}{375 + \text{A/P}} \geq 3 \quad \Rightarrow \quad \text{A/P} \leq 125.$$

That is, notes payable can increase by at most \$25.

Suppose projected current liabilities are then \$500. To maintain a total debt ratio of at most 0.4 when projected total assets are \$3,750 means that

$$\frac{500 + \text{LTD}}{3,750} \leq 0.4 \quad \Rightarrow \quad \text{LTD} \leq \$1,000.$$

Therefore, LTD can increase by at most \$200.

So far, we have found $\$25 + \$200 = \$225$, but we need $\$455$. The amount missing, which is $455 - 225 = \$230$, will be obtained by raising equity. Hence a possible financing plan is

- Increase notes payable by $\$25$
- Increase long-term debt by $\$200$
- Raise $\$230$ by issuing new equity

(d) Find Rosegarten's internal growth rate.

Answer: Two answers were accepted here. Either you use the formula $\frac{ROA \times R}{1 - ROA \times R}$, which assumes that accounts payable do not vary with sales, or you take into account the increase in accounts payable. To find Rosegarten's internal growth rate in the latter case, we need to use the equation derived in (a). The growth rate that does not require any external financing, g_i is such that

$$EFN = -176 + 2,524g_i = 0 \quad \Rightarrow \quad g_i = \frac{176}{2,524} = 6.97\%.$$

If you use the equation in the text, the internal growth rate obtained is

$$\frac{ROA \times R}{1 - ROA \times R} = \frac{.088 \times \frac{2}{3}}{1 - .088 \times \frac{2}{3}} = 6.23\%,$$

which is lower than 6.97% since the increase in accounts payable allows to finance more growth than if these were independent of sales.

(e) Find Rosegarten's sustainable growth rate.

Answer: In this case, we can use the equation in the text since it allows debt to increase in proportions with total equity, which will include the increase in accounts payable. Hence Rosegarten's sustainable growth rate is

$$g_s = \frac{ROE \times R}{1 - ROE \times R} = \frac{(264/1,800) \times \frac{2}{3}}{1 - (264/1,800) \times \frac{2}{3}} = 10.84\%.$$

To show that the increase in accounts payable does not create any problem, note that retained earnings increase by $1.1084 \times 176 = 195.0784$, and thus total equity increases by $\frac{195.0784}{1,800} = 10.84\%$. Hence total debt can also increase by 10.84%,

which means that a total of $.1084 \times 1,200 = \$130.08$ can be borrowed, which is more than the \$75 increase in accounts payable.

3. The most recent financial statements for AWOL Tours, Inc., are shown in Table 8 and Table 9. Sales for 2001 are projected to grow by 20 percent. Interest expense will remain constant; the tax rate and the dividend payout rate will also remain constant. Costs, other expenses, current assets and accounts payable increase in proportions with sales.

(a) If the firm is operating at full capacity and no new debt or equity is issued, what is the external financing needed to support the 20 percent growth rate?

Answer: Since interest expense remains constant, the profit margin varies when sales grow. Hence the equation for EFN will differ from what we have used so far. First note that net income is equal to $(1 - t) \times (\text{EBIT} - I)$, where t is the tax rate, EBIT denotes earnings before interest and taxes and I is the interest expense. Since EBIT grows in proportions with sales, a sales growth rate of g implies a projected net income of $(1 - t) \times ((1 + g)\text{EBIT} - I)$. As above, accounts payable increase in proportions with sales, and thus the external financing needed to support a growth rate of g is

$$\text{EFN} = Ag - (1 - t) \times ((1 + g)\text{EBIT} - I) \times R - (\text{A/P}) \times g,$$

where A is total assets, A/P denotes accounts payable and R is the retention ratio. This gives us (all numbers in 000's)

$$\text{EFN} = 390g - .65((1 + g)140 - 17).6 - 50g = -47.97 + 285.4g$$

If $g = 20\%$, this gives us

$$\text{EFN} = -47.97 + 285.4 \times .2 = 9.11.$$

that is \$9,110 is the external financing needed.

- (b) Suppose that the firm was operating at only 90 percent capacity in 2000. What is EFN now?

Answer: The actual net fixed assets can support $\frac{\$700,000}{.9} = \$777,777.78$ in sales. At full capacity, net fixed assets represent $\frac{275,000}{777,777.78} = 35.35\%$ of sales. Hence $1.2 \times \$700,000 = \$840,000$ of sales can be achieved with $.3535714 \times 840,000 = \$296,940$ of fixed assets used at full capacity. The increase in total assets is then

$$.2 \times \underbrace{115,000}_{\text{current assets}} + (296,940 - 275,000) = \$44,940.$$

The changes on the right-hand side of the balance sheet are as in (a), that is

$$(1 - t) \times ((1 + g)\text{EBIT} - I) \times R + (A/P) \times g = \$68,890.$$

Hence external financing needed in this case is

$$\text{EFN} = 44,940 - 68,890 = -\$23,950.$$

- (c) Assume the firm is operating at full capacity, and suppose it wishes to keep its debt/equity ratio constant. What is EFN now?

Answer: Keeping the debt/equity ratio constant means that total debt can increase by

$$\frac{(1 - t)((1 + g)\text{EBIT} - I)R}{\text{total equity}} \times \text{total debt} = \frac{58,890}{215,000} \times 175,000 = \$47,933.72.$$

Note that this is greater than the increase in accounts payable so we don't need to worry about this one. External financing needed is then

$$\begin{aligned} Ag - (1 - t)((1 + g)\text{EBIT} - I)R - 47,933.72 \\ = 78,000 - 58,890 - 47,933.72 \\ = -\$28,823.72. \end{aligned}$$

- (d) Redo problem (a) using sales growth rates of 25 and 30 percent. Illustrate graphically the relationship between EFN and the growth rate, and use this graph to

determine the relationship between them. At what growth rate is the EFN equal to zero? Why is this internal growth rate different from that found by using the equation in the text.

Answer: All we need to do here is use the equation found in (a), i.e.

$$\text{EFN} = -47.97 + 285.4g .$$

So EFN is $-47,970 + 285,400 \times .25 = \$23,380$ when the growth rate is 25%, and EFN is $-47,970 + 285,400 \times .3 = \$37,650$ when the growth rate is 30%.

The internal growth rate, g_i , is such that

$$\text{EFN} = -47.97 + 285.4g_i = 0 \Rightarrow 16.8\% .$$

Sunrise Inc.

1999 and 2000 Balance Sheets

	<i>Assets</i>		<i>Liabilities and Owners' Equity</i>		
	2000	1999		2000	1999
Current assets			Current liabilities		
Cash	\$1,075	\$2,099	Accounts payable	\$1,129	\$1,095
Accounts receivable	1,623	1,203	Notes payable	<u>208</u>	<u>195</u>
Inventory	<u>3,530</u>	<u>2,200</u>	Total	<u>\$1,337</u>	<u>\$1,290</u>
Total	<u>\$6,228</u>	<u>\$5,502</u>			
			Long-term debt	<u>\$5,089</u>	<u>\$5,118</u>
Fixed assets			Owners' equity		
Net fixed assets	<u>\$10,230</u>	<u>\$10,007</u>	Common stock	\$5,100	\$4,800
			Retained earnings	<u>4,932</u>	<u>4,301</u>
			Total equity	<u>\$10,032</u>	<u>\$9,101</u>
Total assets	<u>\$16,458</u>	<u>\$15,509</u>	Total liabilities and equity	<u>\$16,458</u>	<u>\$15,509</u>

Table 1: Balance sheets for Sunrise Inc.

Sunrise Inc.

Income Statements for 1999 and 2000

	<u>2000</u>	<u>1999</u>
Sales	\$7,550	\$7,000
Cost of goods sold	(3,900)	(3,600)
Selling expenses	(1,100)	(1,050)
Depreciation	<u>(350)</u>	<u>(315)</u>
Earnings before interest and taxes (EBIT)	\$2,200	\$2,035
Interest	<u>(500)</u>	<u>(435)</u>
Taxable income	\$1,700	\$1,600
Taxes (35%)	<u>(595)</u>	<u>(560)</u>
Net income	<u>\$1,105</u>	<u>\$1,040</u>
Dividends	\$474	\$434
Addition to retained earnings	\$631	\$606

Table 2: Income statements for Sunrise Inc.

Sunrise Inc.

2000 Statement of Change in Financial Position

<i>Operating activities</i>	
Net Income	\$1,105
Depreciation	350
Increase in A/P	34
Increase in A/R	-420
Increase in inventory	<u>-1,330</u>
Net cash from operating activities	<u>-\$261</u>
<i>Investment activities</i>	
Fixed asset acquisitions	<u>-\$573</u>
Net cash from investment activities	<u>-\$573</u>
<i>Financing activities</i>	
Increase in notes payable	\$13
Decrease in long-term debt	-29
Dividends paid	-474
Increase in common stock	<u>300</u>
Net cash from financing activities	<u>-\$190</u>
<i>Net change in cash</i>	<u><u>-\$1,024</u></u>

Table 3: Sunrise Inc's statement of change in financial position.

Sunrise Inc.

1999 and 2000 Common-Size Balance Sheets

	<i>Assets</i>		<i>Liabilities and Owners' Equity</i>	
	2000	1999	2000	1999
Current assets			Current liabilities	
Cash	6.5%	13.5%	Accounts payable	6.8% 7.1%
Accounts receivable	9.9%	7.8%	Notes payable	<u>1.3%</u> <u>1.3%</u>
Inventory	<u>21.4%</u>	<u>14.2%</u>	Total	<u>8.1%</u> <u>8.4%</u>
Total	<u>37.8%</u>	<u>35.5%</u>		
Fixed assets			Long-term debt	<u>30.9%</u> <u>33.0%</u>
Net fixed assets	<u>62.2%</u>	<u>64.5%</u>	Owners' equity	
			Common stock	31.0% 30.9%
			Retained earnings	<u>30.0%</u> <u>27.7%</u>
			Total equity	<u>61.0%</u> <u>58.6%</u>
Total assets	<u>100%</u>	<u>100%</u>	Total liabilities and equity	<u>100%</u> <u>100%</u>

Table 4: Common-size balance sheets for Sunrise Inc.

Sunrise Inc.

Common-Size Income Statements for 1999 and 2000

	<u>2000</u>	<u>1999</u>
Sales	100.0%	100.0%
Cost of goods sold	51.7%	51.4%
Selling expenses	14.6%	15.0%
Depreciation	<u>4.6%</u>	<u>4.5%</u>
Earnings before interest and taxes (EBIT)	29.1%	29.1%
Interest	<u>6.6%</u>	<u>6.2%</u>
Taxable income	22.5%	22.9%
Taxes (35%)	<u>7.9%</u>	<u>8.0%</u>
Net income	<u>14.6%</u>	<u>14.9%</u>
Dividends	6.3%	6.2%
Addition to retained earnings	8.3%	8.7%

Table 5: Common-size income statements for Sunrise Inc.

Rosegarten Corporation

2000 Income Statement

Sales	\$2,000
Costs	<u>(1,600)</u>
Taxable income	\$400
Taxes (34%)	<u>(136)</u>
Net income	<u><u>\$264</u></u>
Dividends	\$88
Addition to retained earnings	\$176

Table 6: Income statement for Rosegarten Corporation.

Rosegarten Corporation

Balance Sheet as of December 31, 2000

<i>Assets</i>		<i>Liabilities and Owners' Equity</i>	
Current assets		Current liabilities	
Cash	\$160	Accounts payable	\$300
Accounts receivable	440	Notes payable	<u>100</u>
Inventory	<u>600</u>	Total	<u>\$400</u>
Total	<u>\$1,200</u>		
Fixed assets		Long-term debt	<u>\$800</u>
Net fixed assets	<u>\$1,800</u>	Owners' equity	
		Common stock	\$800
		Retained earnings	<u>1,000</u>
		Total equity	<u>\$1,800</u>
Total assets	<u><u>\$3,000</u></u>	Total liabilities and equity	<u><u>\$3,000</u></u>

Table 7: Balance sheet for Rosegarten Corporation.

AWOL Tours, Inc.

2000 Income Statement

Sales	\$700,000
Costs	(550,000)
Other expenses	<u>(10,000)</u>
Earnings before interest and taxes	\$140,000
Interest paid	<u>(17,000)</u>
Taxable income	\$123,000
Taxes (35%)	<u>(43,050)</u>
Net income	<u><u>\$79,950</u></u>
Dividends	\$31,980
Addition to retained earnings	\$47,970

Table 8: Income statement for AWOL Tours, Inc..

AWOL Tours, Inc.

Balance Sheet as of December 31, 2000

<i>Assets</i>		<i>Liabilities and Owners' Equity</i>	
Current assets		Current liabilities	
Cash	\$20,000	Accounts payable	\$50,000
Accounts receivable	35,000	Notes payable	<u>5,000</u>
Inventory	<u>60,000</u>	Total	<u>\$55,000</u>
Total	<u><u>\$115,000</u></u>		
		Long-term debt	<u>\$120,000</u>
Fixed assets		Owners' equity	
Net fixed assets	<u>\$275,000</u>	Common stock	\$15,000
		Retained earnings	<u>200,000</u>
		Total equity	<u>\$215,000</u>
Total assets	<u><u>\$390,000</u></u>	Total liabilities and equity	<u><u>\$390,000</u></u>

Table 9: Balance sheet for AWOL Tours, Inc..