

Chapter 18

Current Asset Management

ANSWERS TO END-OF-CHAPTER QUESTIONS

- 18-1 The two principal reasons for holding cash are for transactions and compensating balances. The target cash balance is not equal to the sum of the holdings for each reason because the same money can often partially satisfy both motives.
- 18-2 The four elements in a firm's credit policy are (1) credit standards, (2) credit period, (3) discount policy, and (4) collection policy. The firm is not required to accept the credit policies employed by its competition, but the optimal credit policy cannot be determined without considering competitors' credit policies. A firm's credit policy has an important influence on its volume of sales, and thus on its profitability.
- 18-3 The latest date for paying and taking discounts is May 10. The date by which the payment must be made is June 9.
- 18-4 No. Although B sustains slightly more losses due to uncollectible accounts, its credit manager may have a wise policy that is generating more sales revenues (and thus profits) than would be the case if he had a policy that cut those losses to zero.

18-5	<u>A/R</u>	<u>Sales</u>	<u>Profit</u>
a. The firm tightens its credit standards.	<u>-</u>	<u>-</u>	<u>0</u>
b. The terms of trade are changed from 2/10, net 30, to 3/10, net 30.	<u>0</u>	<u>+</u>	<u>0</u>
c. The terms are changed from 2/10, net 30, to 3/10, net 40.	<u>0</u>	<u>+</u>	<u>0</u>
d. The credit manager gets tough with past-due accounts.	<u>-</u>	<u>-</u>	<u>0</u>

Explanations:

- a. When a firm "tightens" its credit standards, it sells on credit more selectively. It will likely sell less and certainly will make fewer credit sales. Profit may be affected in either direction.

- c. A reduction in the portfolio of Treasury bills (marketable securities) would cause the firm's cash balance to rise if the Treasury bills had been held in lieu of cash balances.
- d. An overdraft system will enable the firm to hold less cash.
- e. If the amount borrowed equals the increase in cheque-writing, the target cash balance will not change. Otherwise, the target cash balance may rise or fall, depending on the relationship between the amount borrowed and the number of cheques written.
- f. The firm will tend to hold more Treasury bills, and the target cash balance will tend to decline.

SOLUTIONS TO END-OF-CHAPTER PROBLEMS

18-1 Sales = \$10,000,000; S/I = 2×

$$\begin{aligned}\text{Inventory} &= S/2 \\ &= \frac{\$10,000,000}{2} = \$5,000,000.\end{aligned}$$

If S/I = 5×, how much cash is freed up?

$$\begin{aligned}\text{Inventory} &= S/5 \\ &= \frac{\$10,000,000}{5} = \$2,000,000.\end{aligned}$$

$$\text{Cash Freed} = \$5,000,000 - \$2,000,000 = \$3,000,000.$$

18-2 DSO = 17; Credit Sales/Day = \$3,500; A/R = ?

$$\text{DSO} = \frac{\text{A/R}}{\text{S}/365}$$

$$17 = \frac{\text{A/R}}{\$3,500}$$

$$\text{A/R} = 17 \times \$3,500 = \$59,500.$$

18-3 Analysis of change:

	Projected Income Statement Under Current Credit Policy	Effect of Credit Policy Change	Projected Income Statement Under New Credit Policy
Gross sales	\$2,200,000	+ \$100,000	\$ 2,300,000
Less: Discounts	<u>0</u>	<u>0</u>	<u>0</u>
Net sales	2,200,000	+ 100,000	2,300,000
Variable costs	<u>1,650,000</u>	+ <u>75,000</u>	<u>1,725,000</u>
Profit before credit costs and taxes	550,000	+ 25,000	575,000
Credit-related costs:			
Cost of carrying receivables*	15,822	+ 13,952	29,774
Collection expense	42,000	- 10,000	32,000
Bad debt losses	<u>33,000</u>	+ <u>24,500</u>	<u>57,500</u>
Profit before taxes	459,178	- 3,452	455,726
Taxes (30%)	<u>137,753</u>	- <u>1,036</u>	<u>136,718</u>
Net income	<u>\$ 321,425</u>	- <u>\$ 2,416</u>	<u>\$ 319,008</u>

*Cost of carrying receivables:

$$(\text{DSO}) \left(\begin{array}{c} \text{Sales} \\ \text{per day} \end{array} \right) \left(\begin{array}{c} \text{Variable} \\ \text{cost ratio} \end{array} \right) \left(\begin{array}{c} \text{Cost of} \\ \text{funds} \end{array} \right)$$

$$\text{Current policy} = (25) \left(\frac{\$2,200,000}{365} \right) (0.75)(0.14) = \$15,822.$$

$$\text{New policy} = (45) \left(\frac{\$2,300,000}{365} \right) (0.75)(0.14) = \$29,774.$$

+

Since the change in profitability is negative (\$2,416), the firm should not relax its collection efforts.

Note:

If you wish to consider the opportunity cost or benefit of the change in time (i.e., the change in the DSO) it takes to receive the profits from the sales, then we need to make one additional calculation. In this case, the DSO is longer with the new policy, so the company receives its profits later, thus it is a cost:

$$\text{Opportunity cost} = (20)(\$2,200,000/365)(0.25)(0.14) = \$4,219.$$

The new credit policy cost of carrying receivables is now \$33,993 (\$29,774 + \$4,219).

Profit before credit costs and taxes	\$ 550,000	+ \$ 25,000	\$ 575,000
Credit-related costs:			
Cost of carrying receivables	15,822	+ 18,171	33,993
Collection expense	42,000	- 10,000	32,000
Bad debt losses	<u>33,000</u>	+ <u>24,500</u>	<u>57,500</u>
Profit before taxes	459,178	- 7,671	451,507
Taxes (30%)	<u>137,753</u>	- <u>2,301</u>	<u>135,452</u>
Net income	<u>\$ 321,425</u>	- <u>\$ 5,370</u>	<u>\$ 316,055</u>

18-4 Analysis of change:

	Projected Income Statement Under Current Credit Policy	Effect of Credit Policy Change	Projected Income Statement Under New Credit Policy
Gross sales	\$ 2,500,000	-\$ 125,000	\$ 2,375,000
Less: Discounts	<u>0</u>	<u>0</u>	<u>0</u>
Net sales	2,500,000	- 125,000	2,375,000
Variable costs	<u>2,125,000</u>	<u>- 106,250</u>	<u>2,018,750</u>
Profit before credit costs and taxes	375,000	- 18,750	356,250
Credit-related costs:			
Cost of carrying receivables*	99,555	- 64,711	34,844
Bad debt losses	<u>0</u>	<u>0</u>	<u>0</u>
Profit before taxes	275,445	+ 45,961	321,406
Taxes (40%)	<u>110,178</u>	+ <u>18,384</u>	<u>128,562</u>
Net income	<u>\$ 165,267</u>	+ <u>\$ 27,577</u>	<u>\$ 192,844</u>

*Cost of carrying receivables:

$$(\text{DSO}) \left(\frac{\text{Sales}}{\text{per day}} \right) \left(\frac{\text{Variable}}{\text{cost ratio}} \right) \left(\frac{\text{Cost of}}{\text{funds}} \right)$$

$$\text{Current policy} = (95) \left(\frac{\$2,500,000}{365} \right) (0.85)(0.18) = \$99,555.$$

$$\text{New policy} = (35) \left(\frac{\$2,375,000}{365} \right) (0.85)(0.18) = \$34,844.$$

The firm should change its credit terms since the change in profitability is positive.

Note:

If you wish to consider the opportunity cost or benefit of the change in time (i.e., the change in the DSO) it takes to receive the profits from the sales, then we need to make one additional calculation. In this case, the DSO is shorter with the new policy, so the company receives its profits earlier, thus it is a benefit:

$$\text{Opportunity benefit} = (60)(\$2,500,000/365)(0.15)(0.18) = \$11,096.$$

The new credit policy cost of carrying receivables is now \$23,748 (\$34,844 - \$11,096).

Profit before credit costs and taxes	\$ 375,000	- \$ 18,750	\$ 356,250
Credit-related costs:			
Cost of carrying receivables	99,555	- 75,807	23,748
Bad debt losses	<u>0</u>	<u>0</u>	<u>0</u>
Profit before taxes	275,445	+ 57,057	332,502
Taxes (40%)	<u>110,178</u>	+ <u>22,823</u>	<u>133,001</u>
Net income	<u>\$ 165,267</u>	+ <u>\$ 34,234</u>	<u>\$ 199,501</u>

- 18-5 a. $0.4(10) + 0.6(40) = 28$ days.
- b. $\$912,500/365 = \$2,500$ sales per day.
 $\$2,500(28) = \$70,000 =$ Average receivables.
- c. Customers who do not take the discount and pay on Day 30:
 i. Nominal cost: $3/97 \times 365/20 = 56.44\%$.
 ii. Effective cost: $(1 + 3/97)^{365/20} - 1 = 1.7435 - 1 = 0.7435 = 74.35\%$.
- d. Customers who do not take the discount and pay on Day 40:
 i. Nominal cost: $3/97 \times 365/30 = 37.63\%$.
 ii. Effective cost: $(1 + 3/97)^{365/30} - 1 = 0.4486 = 44.86\%$.
- e. $0.4(10) + 0.6(30) = 22$ days. $\$912,500/365 = \$2,500$ sales per day.
 $\$2,500(22) = \$55,000 =$ Average receivables.

Sales may also decline as a result of the tighter credit. This would further reduce receivables. Also, some customers may now take discounts, further reducing receivables.

18-6 a.
$$\text{EOQ} = \sqrt{\frac{2(F)(S)}{(C)(P)}} = \sqrt{\frac{2(\$15)(90,000)}{(0.2)(1.5)}} = \sqrt{9,000,000} = 3,000 \text{ bags per order.}$$

- b. The maximum inventory, which is on hand immediately after a new order is received, is 4,000 bags (3,000 + 1,000 safety stock). At \$1.50 per bag the dollar cost is \$6,000.

c.
$$\text{Average inventory} = \frac{3,000}{2} + 1,000 = 1,500 + 1,000 = 2,500 \text{ bags or } \$3,750.$$

d.
$$\frac{90,000}{3,000} = 30 \text{ orders per year. } \frac{365 \text{ days}}{30} = 12.2 \approx 12 \text{ days.}$$

The company must place an order every 12 days.

18-7 a.

	Projected Income Statement Under Current Credit Policy	Effect of Credit Policy Change	Projected Income Statement Under New Credit Policy
Gross Sales	\$7,200,000	- \$360,000	\$6,840,000
Less: Discounts	<u>36,000</u>	- <u>8,640</u>	<u>27,360</u>
Net Sales	7,164,000	- 351,360	6,812,640
Variable costs	<u>4,320,000</u>	- <u>216,000</u>	<u>4,104,000</u>
Profit before credit costs and taxes	2,844,000	- 135,360	2,708,640
Cost of carrying receivables*	44,739	- 6,960	37,779
Collection expense	168,000	+ 72,000	240,000
Bad debt losses	<u>216,000</u>	- <u>113,400</u>	<u>102,600</u>
Profit before taxes	2,415,261	- 87,000	2,328,261
Taxes (30%)	<u>724,578</u>	- <u>26,100</u>	<u>698,478</u>
Net income	<u>\$1,690,683</u>	- <u>\$ 60,900</u>	<u>\$1,629,783</u>

*Cost of carrying receivables:

$$\left(\text{DSO} \right) \left(\frac{\text{Sales}}{\text{per day}} \right) \left(\frac{\text{Variable}}{\text{cost ratio}} \right) \left(\frac{\text{Cost of}}{\text{funds}} \right).$$

$$\text{DSO}_{(\text{current})} = (0.20 \times 10) + (0.30 \times 15) + (0.50 \times 50) = 31.5$$

$$\text{Current policy} = (31.5) \left(\frac{\$7,200,000}{365} \right) (0.60)(0.12) = \$44,739.$$

$$\text{DSO}_{(\text{new})} = (0.40 \times 10) + (0.60 \times 40) = 28$$

$$\text{New policy} = (28) \left(\frac{\$6,840,000}{365} \right) (0.60)(0.12) = \$37,779.$$

Note:

If you wish to consider the opportunity cost or benefit of the change in time (i.e., the change in the DSO) it takes to receive the profits from the sales, then we need to make one additional calculation. In this case, the DSO shortens with the new policy, so the company receives its profits quicker, thus it is a benefit:

Opportunity benefit = $(3.5)(\$7,200,000/365)(0.40)(0.12) = \$3,314$.

The new credit policy cost of carrying receivables is now \$34,465 (\$37,779 - \$3,314).

Profit before credit costs and taxes	\$2,844,000	- \$135,360	\$2,708,640
Cost of carrying receivables	44,739	- 10,274	34,465
Collection expense	168,000	+ 72,000	240,000
Bad debt losses	<u>216,000</u>	- <u>113,400</u>	<u>102,600</u>
Profit before taxes	2,415,261	- 83,686	2,331,575
Taxes (30%)	<u>724,578</u>	- <u>25,106</u>	<u>699,472</u>
Net income	<u>\$1,690,683</u>	- <u>\$ 58,580</u>	<u>\$1,632,103</u>

- b. The minimum sales level acceptable is the level that would result in the same income level with the new policy as the old one. The old policy results in \$1,690,683 of income, therefore we solve for the level of sales under the new policy that results in income of \$1,690,683.

Let S = sales

$$\left[S - (0.40)(0.01)S - (0.60)S - (28) \frac{S}{365} (0.60)(0.12) - (0.015)S - \$240,000 \right] (1 - 0.30) = \$1,690,683$$

$$S = \$7,071,706$$

$(0.40)(0.01)S$ = discounts

$(0.60)S$ = variable costs

$(28) \frac{S}{365} (0.60)(0.12)$ = cost of carrying receivables

\$240,000 = collection expense

$0.015S$ = bad debt losses

$$(\$7,200,000 - \$7,071,706)/\$7,200,000 = 0.0178 = \underline{1.78\%}$$

18-8 a.

$$EOQ = \sqrt{\frac{2(F)(S)}{(C)(P)}} = \sqrt{\frac{2(\$1,000)(5,000)}{0.2(\$200)}} = \sqrt{250,000} = 500 \text{ units.}$$

When 500 units are ordered each time an order is placed, total inventory costs equal \$20,000:

$$\begin{aligned} TIC &= CP(Q/2) + F(S/Q) \\ &= 0.2(\$200)(500/2) + \$1,000(5,000/500) \\ &= \$40(250) + \$1,000(10) \\ &= \$10,000 + \$10,000 = \$20,000. \end{aligned}$$

Note that the average inventory of custom microchips is 250 units, and that 10 orders are placed per year. Also, at the EOQ level, total carrying costs equal total ordering costs.

b. 400 units:

$$\begin{aligned} TIC &= CP(Q/2) + F(S/Q) = 0.2(\$200)(400/2) + \$1,000(5,000/400) \\ &= \$8,000 + \$12,500 = \$20,500. \end{aligned}$$

$$\text{added cost} = \$20,500 - \$20,000 = \$500.$$

600 units:

$$\begin{aligned} TIC &= 0.2(\$200)(600/2) + \$1,000(5,000/600) \\ &= \$12,000 + \$8,333 = \$20,333. \end{aligned}$$

$$\text{added cost} = \$20,333 - \$20,000 = \$333.$$

Note the following points:

- At any order quantity other than $EOQ = 500$ units, total inventory costs are higher than they need be.
- The added cost of not ordering the EOQ amount is not large if the quantity ordered is close to the EOQ. For example, if the order size is 20 percent above the EOQ (600 units), TIC increases by only $\$333/\$20,000 = 1.67\%$.
- If the quantity ordered is less than the EOQ, then total carrying costs decrease, but total ordering costs increase. At $q = 400$ units, carrying costs fall by \$2,000 per year, but ordering costs increase by \$2,500. The net result is an increase in total costs.

- If the quantity ordered is greater than the EOQ, then total carrying costs increase, but total ordering costs decrease. At $Q = 600$ units, carrying costs increase by \$2,000, but ordering costs fall by only \$1,667, so the net result is an increase in total costs.
- c. With an annual usage of 5,000 units, Webster's weekly usage rate is $5,000/52 \approx 96$ units. If the order lead time is 2 weeks, then Webster must reorder each time its inventory reaches $2(96) = 192$ units. Then, after 2 weeks, as it uses its last microchip, the new order of 500 chips arrives.
- d. There are two ways to view the impact of safety stocks on total inventory costs. Webster's total cost of carrying the operating inventory is \$20,000 (see part a). Now the cost of carrying an additional 200 units is $CP(\text{safety stock}) = 0.2(\$200)(200) = \$8,000$. Thus, total inventory costs are increased by \$8,000, for a total of $\$20,000 + \$8,000 = \$28,000$.

Another approach is to recognize that, with a 200-unit safety stock, Webster's average inventory is now $(500/2) + 200 = 450$ units. Thus, its total inventory cost, including safety stock, is \$28,000:

$$\begin{aligned} \text{TIC} &= CP(\text{average inventory}) + F(S/Q) \\ &= 0.2(\$200)(450) + \$1,000(5,000/500) \\ &= \$18,000 + \$10,000 = \$28,000. \end{aligned}$$

Webster must still reorder when the operating inventory reaches 192 units. However, with a safety stock of 200 units in addition to the operating inventory, the reorder point becomes $200 + 192 = 392$ units. Since Webster will reorder when its microchip inventory reaches 392 units, and since the expected delivery time is 2 weeks, Webster's normal 96 unit usage could rise to $392/2 = 196$ units per week over the 2-week delivery period without causing a stockout. Similarly, if usage remains at the expected 96 units per week, Webster could operate for $392/96 \approx 4$ weeks versus the normal two weeks while awaiting delivery of an order.

SOLUTION TO SPREADSHEET PROBLEM

18-9 The detailed solution for the spreadsheet problem is in the file *Ch 18 Build a Model Solution.xlsx* and is available on the textbook's website.

MINI CASE

Rich Jackson, a recent finance graduate, is planning to go into the wholesale building supply business with his brother, Jim, who majored in building construction. The firm would sell primarily to general contractors, and it would start operating next January. Due to the nature of the products, sales would be relatively constant with some fluctuations month to month. Sales estimates for the first 6 months are as follows (in thousands of dollars):

January	\$190	March	\$190	May	\$190
February	210	April	210	June	210

The terms of sale are net 30, but because of special incentives, the brothers expect 30% of the customers (by dollar value) to pay on the 10th day following the sale, 50% to pay on the 40th day, and the remaining 20% to pay on the 70th day. No bad debt losses are expected, because Jim, the building construction expert, knows which contractors are having financial problems.

a. Discuss, in general, what it means for the brothers to set a credit and collections policy.

Answer: When a firm sets its credit and collections policy, it determines four things:

1. The credit period, which is the length of time buyers are given to pay for their purchases
2. The discounts that are given for early payment.
3. The credit standards, which are the financial strength requirements for customers to purchase on credit from the firm.
4. The collection policy, which is how hard the company will work to collect slow-paying accounts.

These policies determine the level of sales and also the level of accounts receivable. Note that although sales contribute to profitability, additional accounts receivable require the investment of funds, so a firm must take both the profits from additional sales and the additional capital required to fund accounts receivable when it determines a credit policy.

b. Assume that, on average, the brothers expect annual sales of 18,000 items at an average price of \$100 per item. (Use a 365-day year.)

1. What is the firm's expected days sales outstanding (DSO)?

Answer: Days sales outstanding = DSO = $0.3(10) + 0.5(40) + 0.2(70) = 37$ days, vs. 30-day credit period. One would expect some customers to pay somewhat slowly, so a 37-day DSO is probably not too bad.

b. 2. What is its expected average daily sales (ADS)?

Answer: Average daily sales = ADS = $\frac{18,000(\$100)}{365} = \$4,931$ per day.

b. 3. What is its expected average accounts receivable level?

Answer: Accounts receivable (A/R) = (DSO)(ADS) = $37(\$4,931) = \$182,466$. Thus, \$182,466 of receivables are outstanding, and the firm must raise capital to carry receivables. If collections could be speeded up, and DSO reduced, then A/R, and hence the required financing, would be reduced.

b. 4. Assume that the firm's profit margin is 25%. How much of the receivables balance must be financed? What would the firm's balance sheet figures for accounts receivable, notes payable and retained earnings be at the end of 1 year if notes payable are used to finance the investment in receivables? Assume that the cost of carrying receivables had been deducted when the 25% profit margin was calculated.

Answer: Although the firm has \$182,466 in receivables, the entire amount does not have to be financed, since 25% of the sales price is profit. This means that 75% of the price represents costs of materials, labour, rent, utilities, insurance, and so on. Thus, the firm must finance only $0.75(\$182,466) = \$136,849$ of the receivables balance. Disregarding other assets and liabilities, its balance sheet would look like this if notes payable are used to finance receivables:

Accounts receivable	\$182,466	Notes payable	\$136,849
		Retained earnings	<u>45,617</u>
			<u>\$182,466</u>

b. 5. If bank loans have a cost of 12%, what is the annual dollar cost of carrying the receivables?

Answer: Cost of carrying receivables = $0.12(\$136,849) = \$16,422$. In addition, there is an opportunity cost associated with not having the use of the profit component of the receivables.

c. What are some factors that influence (1) a firm's receivables level and (2) the dollar cost of carrying receivables?

Answer:

1. As shown in question b.3. above, receivables are a function of the average daily sales and the days sales outstanding. Exogenous economic factors such as the state of the economy and competition within the industry affect average daily sales, but so does the firm's credit policy. The days sales outstanding depends mainly on credit policy, although poor economic conditions can lead to a reduction in customers' ability to make payments.
2. For a given level of receivables, the lower the profit margin, the higher the cost of carrying receivables, because the greater the portion of each sales dollar that must actually be financed. Similarly, the higher the cost of the financing, the higher the dollar cost of carrying the receivables.

- d. Assuming that the monthly sales forecasts given previously are accurate, and that customers pay exactly as was predicted, what would the receivables level be at the end of each month? *To reduce calculations, assume that 30% of the firm's customers pay in the month of sale, 50% pay in the month following the sale, and the remaining 20% pay in the second month following the sale. Note that this is a different assumption than was made earlier. Also assume there are 91 days in each quarter. Use the following format to answer parts d and e:*

<u>Month</u>	E.O.M.		<u>Quarterly</u>		DSO = <u>(A/R)/(ADS)</u>
	<u>Sales</u>	<u>A/R</u>	<u>Sales</u>	<u>ADS</u>	
Jan	\$190	\$133			
Feb	210	185			
Mar	190	175	\$590	\$6.48	27.0
Apr	210				
May	190				
Jun	210				

Answer: (Note: from this point on, the solutions are expressed in thousands of dollars. Also, the table given below is developed in the solutions to parts d and e.)

At the end of January, 30 percent of the \$190 in sales will have been collected, so $(1 - 0.3)(\$190) = 0.7(\$190) = \$133$ will remain outstanding, that is, in the receivables account. At the end of February, 30% + 50% = 80% of January's sales will have been collected, so receivables associated with January sales will be $(1 - 0.3 - 0.5)(\$190) = 0.2(\$190) = \$38$. Of February's \$210 in sales, 30 percent will have been collected, so $0.7(\$210) = \147 will remain outstanding. Thus, the receivables balance at the end of February will be \$38 from January's sales plus \$147 from February's sales, for a total of \$185.

By the end of March, all of January's sales will have been collected, but 20 percent of February's sales and 70 percent of March's sales will still be outstanding, so receivables will equal $0.2(\$210) + 0.7(\$190) = \$175$. Following this logic, the receivables balance at the end of any month can be estimated as follows:

$$A/R = 0.7(\text{sales in that month}) + 0.2(\text{sales in previous month}).$$

<u>Month</u>	E.O.M.		<u>Quarterly</u>		DSO = <u>(A/R)/(ADS)</u>
	<u>Sales</u>	<u>A/R</u>	<u>Sales</u>	<u>ADS</u>	
Jan	\$190	\$133			
Feb	210	185			
Mar	190	175	\$590	\$6.48	27.0
Apr	\$210	\$185			
May	190	175			
Jun	210	185	\$610	\$6.70	27.6

e. **What is the firm's forecasted average daily sales for the first 3 months? For the entire half-year? The days sales outstanding is commonly used to measure receivables performance. What DSO is expected at the end of March? At the end of June? What does the DSO indicate about customers' payments?**

Answer: For the first quarter, sales totalled $\$190 + \$210 + \$190 = \590 , so $ADS = \$590/91 = \6.48 . ADS for the full half-year is $(\$590 + \$610)/182 = \$6.59$. Note that we can rearrange the formula for receivables as follows:

$$A/R = (DSO)(ADS)$$

$$DSO = \frac{A/R}{ADS}$$

$$\text{March: } DSO = \frac{\$175}{\$6.48} = 27.0 \text{ days; June: } DSO = \frac{\$185}{\$6.70} = 27.6 \text{ days.}$$

Use of DSO for analyzing aggregate receivables may not be appropriate when sales are seasonal or fluctuate. Since receivables at a given point in time reflect recent sales, but sales in the DSO calculation represents sales in the past 12 months, a seasonal increase in sales will raise the DSO, even if customers are still paying exactly as before.

f. Construct aging schedules for the end of March and the end of June (use the format given below).

Age of account (days)	March		June	
	A/R	%	A/R	%
0 – 30	\$133	76%		
31 – 60	42	24		
61 – 90	<u>0</u>	<u>0</u>	—	—
	<u>\$175</u>	<u>100%</u>	<u>—</u>	<u>—</u>

Answer: Aging schedule:

Age of account (days)	March			June		
	A/R		%	A/R		%
0 – 30	\$133	Mar	76%	\$147	Jun	79%
31 – 60	42	Feb	24	38	May	21
61 – 90	<u>0</u>	Jan	<u>0</u>	—	Apr	<u>0</u>
	<u>\$175</u>		<u>100%</u>	<u>\$185</u>		<u>100</u>

To see how these aging schedules were constructed, consider first the end-of-March schedule. At that time, 30 percent of March's sales had been collected, so 70 percent remained uncollected: $0.7(\$190) = \133 . February's contribution to receivables is $0.2(\$210) = \42 . Finally, by the end of March, all of January's sales had been collected, so none of January's sales remained outstanding. Thus, the receivables account totals \$175 at the end of March.

The aging schedule total for the 2nd quarter is \$185, the difference being due to small monthly sales fluctuations.

Note that if a company has seasonal sales, the aging schedule will show an increasing or decreasing total, when in fact customers have not altered their payment patterns.

g. Assume now that it is several years later. The brothers are concerned about the firm's current credit terms, which are now net 30, which means that contractors buying building products from the firm are not offered a discount, and are supposed to pay the full amount in 30 days. Gross sales are now running \$1,000,000 a year, and 80% (by dollar volume) of the firm's *paying* customers generally pay the full amount on Day 30, while the other 20% pay, on average, on Day 40. Of the firm's gross sales, 2% end up as bad debt losses.

The brothers are now considering a change in the firm's credit policy. The change would entail (1) changing the credit terms to 2/10, net 20, (2) employing stricter credit standards before granting credit, and (3) enforcing collections with greater vigour than in the past. Thus, cash customers and those paying within 10 days would receive a 2% discount, but all others would have to pay the full amount after only 20 days. The brothers believe that the discount would both attract additional customers and encourage some existing customers to purchase more from the firm—after all, the discount amounts to a price reduction. Of course, these customers would take the discount and, hence, would pay in only 10 days. The net expected result is for sales to increase to \$1,100,000; for 60% of the paying customers to take the discount and pay on the 10th day; for 30% to pay the full amount on Day 20; for 10% to pay late on Day 30; and for bad debt losses to fall from 2% to 1% of gross sales. The firm's operating cost ratio will remain unchanged at 75%, and its cost of carrying receivables will remain unchanged at 12%.

To begin the analysis, describe the four variables that make up a firm's credit policy, and explain how each of them affects sales and collections. Then use the information given in part g to answer parts h through m.

Answer: The four variables that make up a firm's credit policy are (1) the discount offered, including the amount and period; (2) the credit period; (3) the credit standards used when determining who shall receive credit, and how much credit; and (4) the collection policy.

Cash discounts generally produce two benefits: (1) they attract both new customers and expanded sales from current customers, because people view discounts as a price reduction, and (2) discounts cause a reduction in the days sales outstanding, since both new customers and some established customers will pay more promptly in order to get the discount. Of course, these benefits are offset to some degree by the dollar cost of the discounts themselves.

The credit period is the length of time allowed to all "qualified" customers to pay for their purchases. In order to qualify for credit in the first place, customers must meet the firm's credit standards. These dictate the minimum acceptable financial position required of customers to receive credit. Also, a firm may impose differing credit limits depending on the customer's financial strength as judged by the credit department.

Finally, collection policy refers to the procedures that the firm follows to collect past-due accounts. These can range from a simple letter or phone call to turning the account over to a collection agency.

How the firm handles each element of credit policy will have an influence on sales, speed of collections, and bad debt losses. The object is to be tough enough to get timely payments and to minimize bad debt losses, yet not to create ill will and thus lose customers.

h. Under the current credit policy, what is the firm's days sales outstanding (DSO)? What would the expected DSO be if the credit policy change were made?

Answer: Old (current) situation: $DSO_0 = 0.8(30) + 0.2(40) = 32$ days. New situation: $DSO_n = 0.6(10) + 0.3(20) + 0.1(30) = 15$ days. Thus, the new credit policy is expected to cut the DSO approximately in half.

i. What is the dollar amount of the firm's current bad debt losses? What losses would be expected under the new policy?

Answer: Old (current) situation: $BDL_o = 0.02(\$1,000,000) = \$20,000$. New situation: $BDL_n = 0.01(\$1,100,000) = \$11,000$. Thus, the new policy is expected to cut bad debt losses sharply.

j. What would be the firm's expected dollar cost of granting discounts under the new policy?

Answer: Current situation: under the current, no discount policy, the cost of discounts is \$0.
New situation: of the \$1,100,000 gross sales expected under the new policy, 1 percent is lost to bad debts, so good sales = $0.99(\$1,100,000) = \$1,089,000$. Since 60 percent of the good sales are discount sales, discount sales = $0.6(\$1,089,000) = \$653,400$. Finally, the discount is 2 percent, so the cost of discounts is expected to be $0.02(\$653,400) = \$13,068$.

k. What is the firm's current dollar cost of carrying receivables? What would it be after the proposed change?

Answer: Current situation: the firm's average daily sales currently amount to $\$1,000,000/365 = \$2,739.73$. The DSO is 32 days, so accounts receivable amount to $32(\$2,739.73) = \$87,671$. However, only 75 percent of this total represents cash costs—the remainder is profit—so the investment in receivables (the actual amount that must be financed) is $0.75(\$87,671) = \$65,753$. At a cost of 12 percent, the annual cost of carrying the receivables is $0.12(\$65,753) = \$7,890$.
New situation: the cost of carrying the receivables balance under the new policy would be \$4,068:

$$(\$1,100,000/365)(15)(0.75)(0.12) = \$4,068.$$

1. What is the incremental after-tax profit associated with the change in credit terms? Should the company make the change? (Assume a tax rate of 40%.)

	<u>New</u>	<u>Old</u>	<u>Difference</u>
Gross sales		\$1,000,000	
Less discounts	_____	<u>0</u>	_____
Net sales		1,000,000	
Production costs	_____	<u>750,000</u>	_____
Profit before credit			
Costs and taxes		250,000	
Credit-related costs:			
Carrying costs		7,890	
Bad debt losses	_____	<u>20,000</u>	_____
Profit before taxes		222,110	
Taxes (40%)	_____	<u>88,844</u>	_____
Net income	=====	<u>\$133,266</u>	=====

Answer: The income statements and differentials under the two credit policies are shown below:

	<u>New</u>	<u>Old</u>	<u>Difference</u>
Gross sales	\$1,100,000	\$1,000,000	\$100,000
Less discounts	<u>13,068</u>	<u>0</u>	<u>13,068</u>
Net sales	1,086,932	1,000,000	86,932
Production costs	<u>825,000</u>	<u>750,000</u>	<u>75,000</u>
Profit before credit			
Costs and taxes	261,932	250,000	11,932
Credit-related costs:			
Carrying costs	4,068	7,890	(3,822)
Bad debt losses	<u>11,000</u>	<u>20,000</u>	<u>(9,000)</u>
Profit before taxes	246,864	222,110	24,754
Taxes (40%)	<u>98,746</u>	<u>88,844</u>	<u>9,902</u>
Net income	<u>\$148,118</u>	<u>\$ 133,266</u>	<u>\$ 14,852</u>

Thus, if expectations are met, the credit policy change would increase the firm's annual after-tax profit by \$14,852. Since there are no non-cash expenses involved here, the \$14,852 is also the incremental cash flow expected under the new policy.

However, the new policy is not riskless. If the firm's customers do not react as predicted, then the firm's profits could actually decrease as a result of the change. The amount of risk involved in the decision depends on the uncertainty inherent in the estimates, especially the sales estimate. Typically, it is very difficult to predict customers' responses to credit policy changes. Further, a credit policy change may prompt the company's competitors to change their own credit terms, and this could offset the expected increase in sales. Thus, the final decision is judgmental. If the prospect of an annual \$14,852 increase in net income is sufficient to compensate for the risks involved, then the change should be made. (Note: large, national companies

often make credit policy changes in a given region in an effort to determine how customers and competitors will react, and then use the information gained when setting national policy. Note also that credit policy changes may not be announced in a “broadcast” sense so as to slow down competitors’ reactions.)

m. Suppose the firm makes the change, but its competitors react by making similar changes to their own credit terms, with the net result being that gross sales remain at the current \$1,000,000 level. What would the impact be on the firm’s after-tax profitability?

Answer: If sales remain at \$1,000,000 after the change is made, then the following situation would exist:

Gross sales	\$1,000,000
Less discounts	<u>11,880</u>
Net sales	988,120
Production costs	<u>750,000</u>
Profit before credit	
Costs and taxes	238,120
Credit costs:	
Carrying costs	3,699
Bad debt losses	<u>10,000</u>
Profit before taxes	224,421
Taxes (40%)	<u>89,768</u>
Net income	<u>\$ 134,653</u>

Under the old terms the net income was \$133,266, so the policy change would result in a slight incremental gain of \$134,653 - \$133,266 = \$1,387.