

CHAPTER 27

Providing and Obtaining Credit

Chapter 22 covered the basics of working capital management, including a brief discussion of trade credit from the standpoint of firms that grant credit and report it as accounts receivable and also from the standpoint of firms that use it and report it as accounts payable. In this chapter we expand the discussion of this important topic, and we also discuss the cost of the other major source of short-term financing, bank loans.

CREDIT POLICY



e-resource

The textbook's Web site contains an Excel file that will guide you through the chapter's calculations. The file for this chapter is **FM11 Ch 27 Tool Kit.xls**, and we encourage you to open the file and follow along as you read the chapter.

As we stated in Chapter 22, the success or failure of a business depends primarily on the demand for its products—as a rule, the higher its sales, the larger its profits and the higher its stock price. Sales, in turn, depend on a number of factors, some exogenous but others under the firm's control. The major controllable determinants of demand are sales price, product quality, advertising, and the firm's **credit policy**. Credit policy, in turn, consists of these four variables:

1. *Credit period*, which is the length of time buyers are given to pay for their purchases.
2. *Discounts* given for early payment, including the discount percentage and how rapidly payment must be made to qualify for the discount.
3. *Credit standards*, which refer to the required financial strength of acceptable credit customers.
4. *Collection policy*, which is measured by the firm's toughness or laxity in attempting to collect on slow-paying accounts.

The credit manager is responsible for administering the firm's credit policy. However, because of the pervasive importance of credit, the credit policy itself is normally established by the executive committee, which usually consists of the president plus the vice-presidents of finance, marketing, and production.

SELF-TEST QUESTION

What are the four credit policy variables?

SETTING THE CREDIT PERIOD AND STANDARDS

A firm's regular **credit terms**, which include the **credit period** and **discount**, might call for sales on a 2/10, net 30 basis to all "acceptable" customers. Here customers are required to pay within 30 days, but they are given a 2 percent discount if they pay by the 10th day. Its **credit standards** would be applied to determine which customers qualify for the regular credit terms, and the amount of credit available to each customer.

Credit Standards

Credit standards refer to the financial strength and creditworthiness a customer must exhibit in order to qualify for credit. If a customer does not qualify for the regular credit terms, it can still purchase from the firm, but under more restrictive terms. For example, a firm's "regular" credit terms might call for payment after 30 days, and these terms might be offered to all qualified customers. The firm's credit standards would be applied to determine which customers qualified for the regular credit terms, and how much credit each should receive. The major factors considered when setting credit standards relate to the likelihood that a given customer will pay slowly or perhaps end up as a bad debt loss.

Setting credit standards requires a measurement of *credit quality*, which is defined in terms of the probability of a customer's default. The probability estimate for a given customer is, for the most part, a subjective judgment. Nevertheless, credit evaluation is a well-established practice, and a good credit manager can make reasonably accurate judgments of the probability of default by different classes of customers.

Managing a credit department requires fast, accurate, and up-to-date information. To help get such information, the National Association of Credit Management (a group with 43,000 member firms) persuaded TRW, a large credit-reporting agency, to develop a computer-based telecommunications network for the collection, storage, retrieval, and distribution of credit information. A typical business credit report would include the following pieces of information:

1. A summary balance sheet and income statement.
2. A number of key ratios, with trend information.
3. Information obtained from the firm's suppliers telling whether it pays promptly or slowly, and whether it has recently failed to make any payments.
4. A verbal description of the physical condition of the firm's operations.
5. A verbal description of the backgrounds of the firm's owners, including any previous bankruptcies, lawsuits, divorce settlement problems, and the like.
6. A summary rating, ranging from A for the best credit risks down to F for those that are deemed likely to default.

Consumer credit is appraised similarly, using income, years of employment, ownership of home, and past credit history (pays on time or has defaulted) as criteria.

Although a great deal of credit information is available, it must still be processed in a judgmental manner. Computerized information systems can assist in making better credit decisions, but, in the final analysis, most credit decisions are really exercises in informed judgment.¹

SELF-TEST QUESTIONS

- What are credit terms?
What is credit quality, and how is it assessed?

¹Credit analysts use procedures ranging from highly sophisticated, computerized "credit-scoring" systems, which actually calculate the statistical probability that a given customer will default, to informal procedures, which involve going through a checklist of factors that should be considered when processing a credit application. The credit-scoring systems use various financial ratios such as the current ratio and the debt ratio (for businesses) and income, years with the same employer, and the like (for individuals) to determine the statistical probability of default. Credit is then granted to those with low default probabilities. The informal procedures often involve examining the "5 C's of Credit": character, capacity, capital, collateral, and conditions. Character is obvious; capacity is a subjective estimate of ability to repay; capital means how much net worth the borrower has; collateral means assets pledged to secure the loan; and conditions refers to business conditions, which affect ability to repay.

SETTING THE COLLECTION POLICY

Collection policy refers to the procedures the firm follows to collect past-due accounts. For example, a letter might be sent to customers when a bill is 10 days past due; a more severe letter, followed by a telephone call, would be sent if payment is not received within 30 days; and the account would be turned over to a collection agency after 90 days.

The collection process can be expensive in terms of both out-of-pocket expenditures and lost goodwill—customers dislike being turned over to a collection agency. However, at least some firmness is needed to prevent an undue lengthening of the collection period and to minimize outright losses. A balance must be struck between the costs and benefits of different collection policies.

Changes in collection policy influence sales, the collection period, and the bad debt loss percentage. All of this should be taken into account when setting the credit policy.

SELF-TEST QUESTION

How does collection policy influence sales, the collection period, and the bad debt loss percentage?

CASH DISCOUNTS

The last element in the credit policy decision, the use of **cash discounts** for early payment, is analyzed by balancing the costs and benefits of different cash discounts. For example, a firm might decide to change its credit terms from “net 30,” which means that customers must pay within 30 days, to “2/10, net 30,” where a 2 percent discount is given if payment is made in ten days. This change should produce two benefits: (1) It should attract new customers who consider the discount to be a price reduction, and (2) the discount should lead to a reduction in the days sales outstanding, because some existing customers will pay more promptly in order to get the discount. Offsetting these benefits is the dollar cost of the discounts. The optimal discount percentage is established at the point where the marginal costs and benefits are exactly offsetting.

If sales are seasonal, a firm may use **seasonal dating** on discounts. For example, Slimware Inc., a swimsuit manufacturer, sells on terms of 2/10, net 30, May 1 dating. This means that the effective invoice date is May 1, even if the sale was made back in January. The discount may be taken up to May 10; otherwise, the full amount must be paid on May 30. Slimware produces throughout the year, but retail sales of bathing suits are concentrated in the spring and early summer. By offering seasonal dating, the company induces some of its customers to stock up early, saving Slimware some storage costs and also “nailing down sales.”

SELF-TEST QUESTIONS

How can cash discounts be used to influence sales volume and the DSO? What is seasonal dating?

OTHER FACTORS INFLUENCING CREDIT POLICY

In addition to the factors discussed in previous sections, two other points should be made regarding credit policy.

Profit Potential

We have emphasized the costs of granting credit. *However, if it is possible to sell on credit and also to impose a carrying charge on the receivables that are outstanding, then credit sales can actually be more profitable than cash sales.* This is especially true for consumer durables (autos, appliances, and so on), but it is also true for certain types of industrial equipment. Thus, GM's General Motors Acceptance Corporation (GMAC) unit, which finances automobiles, is highly profitable, as is Sears' credit subsidiary.² Some encyclopedia companies even lose money on cash sales but more than make up these losses from the carrying charges on their credit sales. Obviously, such companies would rather sell on credit than for cash!

The carrying charges on outstanding credit are generally about 18 percent on a nominal basis: 1.5 percent per month, so $1.5\% \times 12 = 18\%$. This is equivalent to an effective annual rate of $(1.015)^{12} - 1.0 = 19.6\%$. Having receivables outstanding that earn more than 18 percent is highly profitable unless there are too many bad debt losses.

Legal Considerations

It is illegal, under the Robinson-Patman Act, for a firm to charge prices that discriminate between customers unless these differential prices are cost-justified. The same holds true for credit—it is illegal to offer more favorable credit terms to one customer or class of customers than to another, unless the differences are cost-justified.

SELF-TEST QUESTION

How do profit potential and legal considerations affect a firm's credit policy?

THE PAYMENTS PATTERN APPROACH TO MONITORING RECEIVABLES

In Chapter 22, we discussed two methods for monitoring a firm's receivables position: days sales outstanding and aging schedules. These procedures are useful, especially for monitoring an individual customer's account, but neither is totally suitable for monitoring the aggregate payment performance of all credit customers, especially for a firm that experiences fluctuating credit sales. In this section, we present another way to monitor receivables, the **payments pattern approach**.

The primary point in analyzing the aggregate accounts receivable situation is to see if customers, on average, are paying more slowly. If so, accounts receivable will build up, as will the cost of carrying receivables. Further, the payment slowdown may signal a decrease in the quality of the receivables, hence an increase in bad debt losses down the road. The DSO and aging schedules are useful in monitoring credit operations, but both are affected by increases and decreases in the level of sales. Thus, changes in sales levels, including normal seasonal or cyclical changes, can change a firm's DSO and aging schedule even though its customers' payment behavior has not changed at all. For this reason, a procedure called the *payments pattern approach* has been developed to measure any changes that might be occurring in customers' payment behavior.³ To illustrate the payments pattern approach, con-

²Companies that do a large volume of sales financing typically set up subsidiary companies called *captive finance companies* to do the actual financing. Thus, General Motors, DaimlerChrysler, and Ford all have captive finance companies, as do Sears, IBM, and General Electric.

³See Wilbur G. Lewellen and Robert W. Johnson, "A Better Way to Monitor Accounts Receivable," *Harvard Business Review*, May–June 1972, 101–109; and Bernell Stone, "The Payments-Pattern Approach to the Forecasting and Control of Accounts Receivable," *Financial Management*, Autumn 1976, 65–82.

sider the Hanover Company, a small manufacturer of hand tools that commenced operations in January 2004. Table 27-1 contains Hanover's credit sales and receivables data for 2004. Column 2 shows that Hanover's credit sales are seasonal, with the lowest sales in the fall and winter months and the highest during the summer.

Now assume that 10 percent of Hanover's customers pay in the month the sale is made, that 30 percent pay in the first month following the sale, that 40 percent pay in the second month, and that the remaining 20 percent pay in the third month. Further, assume that Hanover's customers have the same payment behavior throughout the year; that is, they always take the same length of time to pay. Column 3 of Table 27-1 contains Hanover's receivables balance at the end of each month. For example, during January Hanover had \$60,000 in sales. Ten percent of the customers paid during the month of sale, so the receivables balance at the end of January was $\$60,000 - 0.1(\$60,000) = (1.0 - 0.1)(\$60,000) = 0.9(\$60,000) = \$54,000$. By the end of February, 10% + 30% = 40% of the customers had paid for January's sales, and 10 percent had paid for February's sales. Thus, the receivables balance at the end of February was $0.6(\$60,000) + 0.9(\$60,000) = \$90,000$. By the end of March, 80 percent of January's sales had been collected, 40 percent of February's had been collected, and 10 percent of March's sales had been collected, so the receivables balance was $0.2(\$60,000) + 0.6(\$60,000) + 0.9(\$60,000) = \$102,000$; and so on.

Columns 4 and 5 give Hanover's average daily sales (ADS) and days sales outstanding (DSO), respectively, as these measures would be calculated from quarterly financial statements. For example, in the April–June quarter, $ADS = (\$60,000 + \$90,000 + \$120,000)/91 = \$2,967$, and the end-of-quarter (June 30) $DSO = \$174,000/\$2,967 = 58.6$ days. Columns 6 and 7 also show ADS and DSO, but here they are calculated on the basis of accumulated sales throughout the year. For example, at the end of June $ADS = \$450,000/182 = \$2,473$ and $DSO = \$174,000/$

TABLE 27-1 Hanover Company: Receivables Data for 2004 (Thousands of Dollars)

Month (1)	Credit Sales for Month (2)	Receivables at End of Month (3)	BASED ON QUARTERLY SALES DATA		BASED ON YEAR-TO-DATE SALES DATA	
			ADS ^a (4)	DSO ^b (5)	ADS ^c (6)	DSO ^c (7)
January	\$ 60	\$ 54				
February	60	90				
March	60	102	\$1.98	52 days	\$1.98	52 days
April	60	102				
May	90	129				
June	120	174	2.97	59	2.47	70
July	120	198				
August	90	177				
September	60	132	2.97	44	2.64	50
October	60	108				
November	60	102				
December	60	102	1.98	52	2.47	41

^aADS = Average daily sales.
^bDSO = Days sales outstanding.
^cWe assume each quarter is 91 days long.

\$2,473 = 70 days. (For the entire year, sales are \$900,000; ADS = \$2,466, and DSO at year-end = 41 days. These last two figures are shown at the bottom of the last two columns.)

The data in Table 27-1 illustrate two major points. First, fluctuating sales lead to changes in the DSO, which suggests that customers are paying faster or slower, even though we know that customers' payment patterns are not changing at all. The rising monthly sales trend causes the calculated DSO to rise, whereas falling sales (as in the third quarter) cause the calculated DSO to fall, even though nothing is changing with regard to when customers actually pay. Second, we see that the DSO depends on an averaging procedure, but regardless of whether quarterly, semianual, or annual data are used, the DSO is still unstable even though payment patterns are *not* changing. Therefore, it is difficult to use the DSO as a monitoring device if the firm's sales exhibit seasonal or cyclical patterns.

Seasonal or cyclical variations also make it difficult to interpret aging schedules. Table 27-2 contains Hanover's aging schedules at the end of each quarter of 2004. At the end of June, Table 27-1 shows that Hanover's receivables balance was \$174,000. Eighty percent of April's \$60,000 of sales had been collected, 40 percent of May's \$90,000 of sales had been collected, and 10 percent of June's \$120,000 of sales had been collected. Thus, the end-of-June receivables balance consisted of $0.2(\$60,000) = \$12,000$ of April sales, $0.6(\$90,000) = \$54,000$ of May sales, and $0.9(\$120,000) = \$108,000$ of June sales. Note again that Hanover's customers had not changed their payment patterns. However, rising sales during the second quarter created the impression of faster payments when judged by the percentage aging schedule, and falling sales after July created the opposite appearance. Thus, neither the DSO nor the aging schedule provides an accurate picture of customers' payment patterns if sales fluctuate during the year or are trending up or down.

With this background, we can now examine another basic tool, the *uncollected balances schedule*, as shown in Table 27-3. At the end of each quarter, the dollar amount of receivables remaining from each of the three month's sales is divided by that month's sales to obtain three receivables-to-sales ratios. For example, at the end of the first quarter \$12,000 of the \$60,000 January sales, or 20 percent, are still outstanding; 60 percent of February sales are still out; and 90 percent of March sales are uncollected. Exactly the same situation is revealed at the end of each of the next three quarters. Thus, Table 27-3 shows that Hanover's customers' payment behavior has remained constant.

Recall that at the beginning of the example we assumed the existence of a constant payments pattern. In a normal situation, the firm's customers' payments pattern would probably vary somewhat over time. Such variations would be shown in the last column of the uncollected balances schedule. For example, suppose cus-

TABLE 27-2 Hanover Company: Quarterly Aging Schedules for 2004 (Thousands of Dollars)

Age of Accounts (Days)	VALUE AND PERCENTAGE OF TOTAL ACCOUNTS RECEIVABLE AT THE END OF EACH QUARTER:							
	March 31		June 30		September 30		December 31	
0-30	\$ 54	53%	\$108	62%	\$ 54	41%	\$ 54	53%
31-60	36	35	54	31	54	41	36	35
61-90	<u>12</u>	<u>12</u>	<u>12</u>	<u>7</u>	<u>24</u>	<u>18</u>	<u>12</u>	<u>12</u>
	<u>\$102</u>	<u>100%</u>	<u>\$174</u>	<u>100%</u>	<u>\$132</u>	<u>100%</u>	<u>\$102</u>	<u>100%</u>

TABLE 27-3 Hanover Company: Quarterly Uncollected Balances Schedules for 2004
(Thousands of Dollars)

Quarter	Monthly Sales	Remaining Receivables at End of Quarter	Remaining Receivables as Percent of Month's Sales at End of Quarter
Quarter 1:			
January	\$ 60	\$ 12	20%
February	60	36	60
March	60	<u>54</u>	<u>90</u>
		<u>\$102</u>	<u>170%</u>
Quarter 2:			
April	\$ 60	\$ 12	20%
May	90	54	60
June	120	<u>108</u>	<u>90</u>
		<u>\$174</u>	<u>170%</u>
Quarter 3:			
July	\$120	\$ 24	20%
August	90	54	60
September	60	<u>54</u>	<u>90</u>
		<u>\$132</u>	<u>170%</u>
Quarter 4:			
October	\$ 60	\$ 12	20%
November	60	36	60
December	60	<u>54</u>	<u>90</u>
		<u>\$102</u>	<u>170%</u>

tomers began to pay their accounts slower in the second quarter. That might cause the second quarter uncollected balances schedule to look like this (in thousands of dollars):

Quarter 2, 2004	Sales	New Remaining Receivables	New Receivables/Sales
April	\$ 60	\$ 16	27%
May	90	70	78
June	120	<u>110</u>	<u>92</u>
		<u>\$196</u>	<u>197%</u>

We see that the receivables-to-sales ratios are now higher than in the corresponding months of the first quarter. This causes the total uncollected balances percentage to rise from 170 to 197 percent, which, in turn, should alert Hanover's managers that customers are paying slower than they did earlier in the year.

The uncollected balances schedule permits a firm to monitor its receivables better, and it can also be used to forecast future receivables balances. When Hanover's pro forma 2005 quarterly balance sheets are constructed, management can use the historical receivables-to-sales ratios, coupled with 2005 sales estimates, to project each quarter's receivables balance. For example, with projected sales as given below, and using the same payments pattern as in 2004, Hanover's projected end-of-June 2005 receivables balance would be as follows:

Quarter 2, 2005	Projected Sales	Receivables/Sales	Projected Receivables
April	\$ 70,000	20%	\$ 14,000
May	100,000	60	60,000
June	140,000	90	126,000
Total projected receivables =			<u>\$200,000</u>

The payments pattern approach permits us to remove the effects of seasonal and/or cyclical sales variation and to construct a more accurate measure of customers' payments patterns. Thus, it provides financial managers with better aggregate information than the days sales outstanding or the aging schedule. Managers should use the payments pattern approach to monitor collection performance as well as to project future receivables requirements.

Except possibly in the inventory and cash management areas, nowhere in the typical firm have computers had more of an effect than in accounts receivable management. A well-run business will use a computer system to record sales, to send out bills, to keep track of when payments are made, to alert the credit manager when an account becomes past due, and to take action automatically to collect past-due accounts (for example, to prepare form letters requesting payment). Additionally, the payment history of each customer can be summarized and used to help establish credit limits for customers and classes of customers, and the data on each account can be aggregated and used for the firm's accounts receivable monitoring system. Finally, historical data can be stored in the firm's database and used to develop inputs for studies related to credit policy changes, as we discuss in the next section.

SELF-TEST QUESTIONS

- Define days sales outstanding (DSO). What can be learned from it? Does it have any deficiencies when used to monitor collections over time?
- What is an aging schedule? What can be learned from it? Does it have any deficiencies when used to monitor collections over time?
- What is the uncollected balances schedule? What advantages does it have over the DSO and the aging schedule for monitoring receivables? How can it be used to forecast a firm's receivables balance?

ANALYZING PROPOSED CHANGES IN CREDIT POLICY

In Chapter 22, we discussed credit policy, including setting the credit period, credit standards, collection policy, and discount percentage, as well as the factors that influence credit policy. A firm's credit policy is reviewed periodically, and policy changes may be proposed. However, before a new policy is adopted, it should be analyzed to determine if it is indeed preferable to the existing policy. In this section, we discuss procedures for analyzing proposed changes in credit policy.

If a firm's credit policy is *eased* by such actions as lengthening the credit period, relaxing credit standards, following a less tough collection policy, or offering cash discounts, then sales should increase: *Easing the credit policy stimulates sales*. Of course, if credit policy is eased and sales rise, then costs will also rise because more labor, materials, and so on, will be required to produce the additional goods. Additionally, receivables outstanding will also increase, which will increase carrying costs. Moreover, bad debts and/or discount expenses may also rise. Thus, the key question when deciding on a proposed credit policy change is this: Will sales revenues increase more than costs, including credit-related costs, causing cash flow to increase, or will the increase in sales revenues be more than offset by higher costs?

Table 27-4 illustrates the general idea behind the analysis of credit policy changes. Column 1 shows the projected 2005 income statement for Monroe Manufacturing under the assumption that the firm's current credit policy is maintained throughout the year. Column 2 shows the expected effects of easing the credit policy by extending the credit period, offering larger discounts, relaxing credit standards, and easing collection efforts. Specifically, Monroe is analyzing the effects of changing its credit terms from 1/10, net 30, to 2/10, net 40, relaxing its credit standards, and putting less pressure on slow-paying customers. Column 3 shows the projected 2005 income statement incorporating the expected effects of an easing in credit policy. The generally looser policy is expected to increase sales and lower collection costs, but discounts and several other types of costs would rise. The overall, bottom-line effect is a \$7 million increase in projected net income. In the following paragraphs, we explain how the numbers in the table were calculated.

Monroe's annual sales are \$400 million. Under its current credit policy, 50 percent of those customers who pay do so on Day 10 and take the discount, 40 percent pay on Day 30, and 10 percent pay late, on Day 40. Thus, Monroe's days sales outstanding is $(0.5)(10) + (0.4)(30) + (0.1)(40) = 21$ days, and discounts total $(0.01)(\$400,000,000)(0.5) = \$2,000,000$.

The cost of carrying receivables is equal to the average receivables balance times the variable cost percentage times the cost of money used to carry receivables. The firm's variable cost ratio is 70 percent, and its pre-tax cost of capital invested in receivables is 20 percent. Thus, its annual cost of carrying receivables is \$3 million:

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

$$(21)(\$400,000,000/365)(0.70)(0.20) = \$3,221,918 \approx \$3 \text{ million.}$$

TABLE 27-4 Monroe Manufacturing Company: Analysis of Changing Credit Policy (Millions of Dollars)

	Projected 2005 Net Income under Current Credit Policy (1)	Effect of Credit Policy Change (2)	Projected 2005 Net Income under New Credit Policy (3)
Gross sales	\$400	+\$130	\$530
Less discounts	<u>2</u>	+ 4	<u>6</u>
Net sales	\$398	+\$126	\$524
Production costs, including overhead	<u>280</u>	+ 91	<u>371</u>
Profit before credit costs and taxes	\$118	+\$ 35	\$153
Credit-related costs:			
Cost of carrying receivables	3	+ 2	5
Credit analysis and collection expenses	5	- 3	2
Bad debt losses	<u>10</u>	+ 22	<u>32</u>
Profit before taxes	\$100	+\$ 14	\$114
State-plus-federal taxes (50%)	<u>50</u>	+ 7	<u>57</u>
Net income	<u>\$ 50</u>	<u>+\$ 7</u>	<u>\$ 57</u>

Note: The above statements include only those cash flows incremental to the credit policy decision.

Only variable costs enter this calculation because this is the only cost element in receivables that must be financed. We are seeking the cost of carrying receivables, and variable costs represent the firm's investment in the cost of goods sold.

Even though Monroe spends \$5 million annually to analyze accounts and to collect bad debts, 2.5 percent of sales will never be collected. Bad debt losses therefore amount to $(0.025)(\$400,000,000) = \$10,000,000$.

Monroe's new credit policy would be 2/10, net 40 versus the old policy of 1/10, net 30, so it would call for a larger discount and a longer payment period, as well as a relaxed collection effort and lower credit standards. The company believes that these changes will lead to a \$130 million increase in sales, to \$530 million per year. Under the new terms, management believes that 60 percent of the customers who pay will take the 2 percent discount, so discounts will increase to $(0.02)(\$530,000,000)(0.60) = \$6,360,000 \approx \$6$ million. Half of the nondiscount customers will pay on Day 40, and the remainder on Day 50. The new DSO is thus estimated to be 24 days:

$$(0.6)(10) + (0.2)(40) + (0.2)(50) = 24 \text{ days.}$$

Also, the cost of carrying receivables will increase to \$5 million:

$$(24)(\$530,000,000/365)(0.70)(0.20) = \$4,878,904 \approx \$5 \text{ million.}^4$$

The company plans to reduce its annual credit analysis and collection expenditures to \$2 million. The reduced credit standards and the relaxed collection effort are expected to raise bad debt losses to about 6 percent of sales, or to $(0.06)(\$530,000,000) = \$31,800,000 \approx \$32,000,000$, which is an increase of \$22 million from the previous level.

The combined effect of all the changes in credit policy is a projected \$7 million annual increase in net income. There would, of course, be corresponding changes on the projected balance sheet—the higher sales would necessitate somewhat larger cash balances, inventories, and, depending on the capacity situation, perhaps more fixed assets. Accounts receivable would, of course, also increase. Because these asset increases would have to be financed, certain liabilities and/or equity would have to be increased.

The \$7 million expected increase in net income is, of course, an estimate, and the actual effects of the change could be quite different. In the first place, there is uncertainty—perhaps quite a lot—about the projected \$130 million increase in sales. Indeed, if the firm's competitors matched its changes, sales might not rise at all. Similar uncertainties must be attached to the number of customers who would take discounts, to production costs at higher or lower sales levels, to the costs of carrying additional receivables, and to bad debt losses. In the final analysis, the decision will be based on judgment, especially concerning the risks involved, but the type of quantitative analysis set forth above is essential to the process.

⁴Since the credit policy change will result in a longer DSO, the firm will have to wait longer to receive its profit on the goods it sells. Therefore, the firm will incur an opportunity cost due to not having the cash from these profits available for investment. The dollar amount of this opportunity cost is equal to the old sales per day times the change in DSO times the contribution margin $(1 - \text{Variable cost ratio})$ times the firm's cost of carrying receivables, or

$$\begin{aligned} \text{Opportunity cost} &= (\text{Old sales}/365)(\Delta\text{DSO})(1 - v)(r) \\ &= (\$400/365)(3)(0.3)(0.20) \\ &= \$0.197 = \$197,000. \end{aligned}$$

For simplicity, we have ignored this opportunity cost in our analysis. However, we consider opportunity costs in the next section, where we discuss incremental analysis.

SELF-TEST QUESTIONS

Describe the procedure for evaluating a change in credit policy using the income statement approach.

Do you think that credit policy decisions are made more on the basis of numerical analyses or on judgmental factors?

ANALYZING PROPOSED CHANGES IN CREDIT POLICY: INCREMENTAL ANALYSIS

To evaluate a proposed change in credit policy, one could compare alternative projected income statements, as we did in Table 27-4. Alternatively, one could develop the data in Column 2, which shows the incremental effect of the proposed change without first developing the pro forma statements. This second approach is often preferable—because firms usually change their credit policies in specific divisions or on specific products, and not across the board, it may not be feasible to develop complete corporate income statements. Of course, the two approaches are based on exactly the same data, so they should produce identical results.

In an incremental analysis, we attempt to determine the increase or decrease in both sales and costs associated with a given easing or tightening of credit policy. The difference between incremental sales and incremental costs is defined as **incremental profit**. If the expected incremental profit is positive, and if it is sufficiently large to compensate for the risks involved, then the proposed credit policy change should be accepted.

The Basic Equations

To ensure that all relevant factors are considered, it is useful to set up some equations to analyze changes in credit policy. We begin by defining the following terms and symbols:

- S_0 = current gross sales.
- S_N = new gross sales, after the change in credit policy. Note that S_N can be greater or less than S_0 .
- $S_N - S_0$ = incremental, or change in, gross sales.
- V = variable costs as a percentage of gross sales. V includes production costs, inventory carrying costs, the cost of administering the credit department, and all other variable costs except bad debt losses, financing costs associated with carrying the investment in receivables, and costs of giving discounts.
- $1 - V$ = contribution margin, or the percentage of each gross sales dollar that goes toward covering overhead and increasing profits. The contribution margin is sometimes called the gross profit margin.
- r = cost of financing the investment in receivables.
- DSO_0 = days sales outstanding prior to the change in credit policy.
- DSO_N = new days sales outstanding, after the credit policy change.
- B_0 = average bad debt loss at the current sales level as a percentage of current gross sales.
- B_N = average bad debt loss at the new sales level as a percentage of new gross sales.
- P_0 = percentage of total customers (by dollar amount) who take discounts under the current credit policy. That is, the percentage of gross sales that are discount sales.

P_N = percentage of total customers (by dollar amount) who will take discounts under the new credit policy.
 D_0 = discount percentage offered at the present time.
 D_N = discount percentage offered under the new credit policy.

With these definitions in mind, we can calculate values for the incremental change in the level of the firm's investment in receivables, ΔI , and the incremental change in pretax profits, ΔP . The formula for calculating ΔI differs depending on whether the change in credit policy results in an increase or decrease in sales. Here we simply present the equations; we discuss and explain them shortly, through use of examples, once all the equations have been set forth.

If the change is expected to *increase* sales—either additional sales to old customers or sales to newly attracted customers, or both—then we have this situation:

FORMULA FOR ΔI IF SALES INCREASE:

$$\begin{aligned}
 \Delta I &= \left[\begin{array}{c} \text{Increased investment in} \\ \text{receivables associated with} \\ \text{original sales} \end{array} \right] + \left[\begin{array}{c} \text{Increased investment in} \\ \text{receivables associated} \\ \text{with incremental sales} \end{array} \right] \\
 &= \left[\begin{array}{c} \text{Change in days} \\ \text{sales outstanding} \end{array} \right] \left[\begin{array}{c} \text{Old sales} \\ \text{per day} \end{array} \right] + V \left[\begin{array}{c} \text{DSO}_N \\ \text{Incremental} \\ \text{sales per day} \end{array} \right] \\
 &= [\text{DSO}_N - \text{DSO}_0] (S_0/365) + V[(\text{DSO}_N)(S_N - S_0)/365].
 \end{aligned} \tag{27-1}$$

However, if the change in credit policy is expected to *decrease* sales, then the change in the level of investment in receivables is calculated as follows:

FORMULA FOR ΔI IF SALES DECREASE:

$$\begin{aligned}
 \Delta I &= \left[\begin{array}{c} \text{Decreased investment in} \\ \text{receivables associated with} \\ \text{remaining original customers} \end{array} \right] + \left[\begin{array}{c} \text{Decreased investment in} \\ \text{receivables associated with} \\ \text{customers who left} \end{array} \right] \\
 &= \left[\begin{array}{c} \text{Change in days} \\ \text{sales} \\ \text{outstanding} \end{array} \right] \left[\begin{array}{c} \text{Remaining} \\ \text{sales} \\ \text{per day} \end{array} \right] + V \left[\begin{array}{c} \text{DSO}_0 \\ \text{Incremental} \\ \text{sales} \\ \text{per day} \end{array} \right] \\
 &= [\text{DSO}_N - \text{DSO}_0] (S_0/365) + V[(\text{DSO}_N)(S_N - S_0)/365].
 \end{aligned} \tag{27-2}$$

With the change in receivables investment calculated, we can now analyze the pretax profitability of the proposed change:

FORMULA FOR ΔP :

$$\begin{aligned}
 \Delta P &= \left[\begin{array}{c} \text{Change in} \\ \text{gross} \\ \text{profit} \end{array} \right] - \left[\begin{array}{c} \text{Change in} \\ \text{cost of} \\ \text{carrying} \\ \text{receivables} \end{array} \right] - \left[\begin{array}{c} \text{Change in} \\ \text{bad debt} \\ \text{losses} \end{array} \right] - \left[\begin{array}{c} \text{Change in} \\ \text{cost of} \\ \text{discounts} \end{array} \right] \\
 &= (S_N - S_0) (1 - V) - r(\Delta I) - (B_N S_N - B_0 S_0) - (D_N S_N P_N - D_0 S_0 P_0).
 \end{aligned} \tag{27-3}$$

Thus, changes in credit policy are analyzed by using either Equation 27-1 or 27-2, depending on whether the proposed change is expected to increase or decrease sales, and Equation 27-3. The rationale behind these equations will become clear as we work through several illustrations. Note that all the terms in Equation 27-3 need not be used in a particular analysis. For example, a change in credit policy might not affect discount sales or bad debt losses, in which case the last two terms of Equation 27-3 would both be zero. Note also that the form of the equations depends on the way in which the variables are first defined.⁵

Changing the Credit Period

In this section, we examine the effects of changing the credit period, while in the following sections we consider changes in credit standards, collection policy, and cash discounts. Throughout, we illustrate the situation with data on Stylish Fashions Inc.

LENGTHENING THE CREDIT PERIOD Stylish Fashions currently sells on a cash-only basis. Since it extends no credit, the company has no funds tied up in receivables, has no bad debt losses, and has no credit expenses of any kind. On the other hand, its sales volume is lower than it would be if credit terms were offered. Stylish is now considering offering credit on 30-day terms. Current sales are \$100,000 per year; variable costs are 60 percent of sales; excess production capacity exists (so no new fixed costs would be incurred as a result of expanded sales); and the cost of capital invested in receivables is 10 percent. Stylish estimates that sales would increase to \$150,000 per year if credit were extended, and that bad debt losses would be 2 percent of total sales. Thus,

$$\begin{aligned}
 S_0 &= \$100,000. \\
 S_N &= \$150,000. \\
 V &= 60\% = 0.6. \\
 1 - V &= 1 - 0.6 = 0.4. \\
 r &= 10\% = 0.10. \\
 DSO_0 &= 0 \text{ days.} \\
 DSO_N &= 30 \text{ days. Here we assume that all customers will pay on time, so } DSO = \\
 &\text{specified credit period. Generally, some customers pay late, so in most} \\
 &\text{cases } DSO \text{ is greater than the specified credit period.} \\
 B_0 &= 0\% = 0.00. \text{ There are currently no bad debt losses.} \\
 B_N &= 2\% = 0.02. \text{ These losses apply to the entire } \$150,000 \text{ new level of} \\
 &\text{sales.} \\
 D_0 = D_N &= 0\%. \text{ No discounts are given under either the current or the} \\
 &\text{proposed credit policies.}
 \end{aligned}$$

Since sales are expected to increase, Equation 27-1 is used to determine the change in the investment in receivables:

$$\begin{aligned}
 \Delta I &= [(DSO_N - DSO_0)(S_0/365)] + V[(DSO_N)(S_N - S_0)/365] \\
 &= [(30 - 0)(\$100,000/365)] + 0.6[30(\$150,000 - \$100,000)/365] \\
 &= \$8,219 + \$2,466 = \$10,685.
 \end{aligned}$$

⁵For example, P_0 and P_N are defined as the percentage of *total* customers who take discounts. If P_0 and P_N were defined as the percentage of *paying* customers (excluding bad debts) who take discounts, then Equation 27-3 would become

$$\Delta P = (S_N - S_0)(1 - V) - r(\Delta I) - (B_N S_N - B_0 S_0) - [D_N S_N P_N (1 - B_N) - D_0 S_0 P_0 (1 - B_0)].$$

Similarly, changing the definitions of B_0 and B_N would affect the third term of Equation 27-3, as we discuss later.

Note that the first term, the increased investment in accounts receivable associated with *old sales*, is based on the full amount of the receivables, whereas the second term, the investment associated with *incremental sales*, consists of incremental receivables multiplied by V , the variable cost percentage. This difference reflects the facts (1) that the firm invests only its variable cost in *incremental* receivables, but (2) that it would have collected the *full sales price* on the old sales earlier had it not made the credit policy change. There is an *opportunity cost* on the profit and a *direct financing cost* associated with the \$8,219 additional investment in receivables from old sales, but only a *direct financing cost* associated with the \$2,466 investment in receivables from incremental sales.

Looking at this another way, *incremental sales* will generate an actual increase in receivables of $(DSO_N)(S_N - S_0)/365 = 30(\$50,000/365) = \$4,110$. However, the only part of that increase that has to be financed (by bank borrowing or from other sources) and reported as a liability on the right side of the balance sheet is the cash outflow required to support the incremental sales, that is, the variable costs, $V(\$4,110) = 0.6(\$4,110) = \$2,466$. The remainder of the receivables increase, \$1,664 of accrued before-tax profit, is reflected on the balance sheet not as some type of credit used to finance receivables, but as an increase in retained earnings generated by the sales. On the other hand, the old receivables level was zero, meaning that the original sales produced cash of $\$100,000/365 = \273.97 per day, which was immediately available for investing in assets or for reducing capital from other sources. The change in credit policy will cause a delay in the collection of these funds, and hence will require the firm (1) to borrow to cover the variable costs of the sales, and (2) to forgo a return on the retained earnings portion, which would have been available immediately had the credit policy change not been made.

Given ΔI , we may now determine the incremental profit, ΔP , associated with the proposed credit period change, using Equation 27-3:

$$\begin{aligned}\Delta P &= (S_N - S_0)(1 - V) - r(\Delta I) - (B_N S_N - B_0 S_0) - (D_N S_N P_N - D_0 S_0 P_0) \\ &= (\$50,000)(0.4) - 0.10(\$10,685) - [0.02(\$150,000) - 0.00(\$100,000)] - \$0 \\ &= \$20,000 - \$1,069 - \$3,000 = \$15,931.\end{aligned}$$

Since pre-tax profits are expected to increase by \$15,931, the credit policy change appears to be desirable.

Two simplifying assumptions that were made in our analysis should be noted: We assumed (1) that all customers paid on time ($DSO = \text{credit period}$), and (2) that there were no current bad debt losses. The assumption of prompt payment can be relaxed quite easily—we can simply use the actual days sales outstanding (say, 40 days), rather than the 30-day credit period, to calculate the investment in receivables, and then use this new (and higher) value of ΔI in Equation 27-3 to calculate ΔP . Thus, if DSO_N were 40 days, then the increased investment in receivables would be

$$\begin{aligned}\Delta I &= [(40 - 0)(\$100,000/365)] + 0.6[40(\$50,000/365)] \\ &= \$10,959 + \$3,288 = \$14,247,\end{aligned}$$

and the change in pre-tax profits would be

$$\begin{aligned}\Delta P &= \$50,000(0.4) - 0.10(\$14,247) - 0.02(\$150,000) \\ &= \$20,000 - \$1,425 - \$3,000 = \$15,575.\end{aligned}$$

The longer collection period causes incremental profits to fall slightly, but they are still positive, so the credit policy should probably still be relaxed.

If the company had been selling on credit initially and therefore incurring some bad debt losses, then we would have had to include this information in Equation 27-3. In our example, B_0S_0 was equal to zero because Stylish Fashions did not previously sell on credit; therefore, the change in bad debt losses was equal to $B_N S_N$.

Note that B_N is defined as the average credit loss percentage on total sales, and not just on incremental sales. Bad debts might be higher for new customers attracted by the credit terms than for old customers who take advantage of them, but B_N is an average of these two groups. However, if one wanted to keep the two groups separate, it would be easy enough to define B_N as the bad debt percentage of the incremental sales only.

Other factors could be introduced into the analysis. For example, the company could consider a further easing of credit by extending the credit period to 60 days, or it could analyze the effects of a sales expansion so great that fixed assets, and hence additional fixed costs, had to be added. Or the variable cost ratio might change as sales increased, falling if economies of scale were present or rising if diseconomies were present. Adding such factors complicates the analysis, but the basic principles are the same—just keep in mind that we are seeking to determine the *incremental sales revenues*, the *incremental costs*, and consequently the *incremental before-tax profit* associated with a given change in credit policy.

SHORTENING THE CREDIT PERIOD Suppose that one year after Stylish Fashions began offering 30-day credit terms, management decided to consider the possibility of shortening the credit period from 30 to 20 days. It was believed that sales would decline by \$20,000 per year from the current level, \$150,000, so $S_N = \$130,000$. It was also believed that the bad debt percentage on these lost sales would be 2 percent, the same as on other sales, and that all other values would remain as given in the last section.

We first calculate the incremental investment in receivables. Because the change in credit policy is expected to decrease sales, Equation 27-2 is used:

$$\begin{aligned}\Delta I &= [(DSO_N - DSO_0)(S_N/365)] + V[(DSO_0)(S_N - S_0)/365] \\ &= [(20 - 30)(\$130,000/365)] + 0.6[30(\$130,000 - \$150,000)/365] \\ &= (-10)(\$356.16) + 0.6[(30)(-\$54.79)] \\ &= -\$3,562 - \$986 = -\$4,548.\end{aligned}$$

With a shorter credit period there is a shorter collection period, so sales are collected sooner. There is also a smaller volume of business, and hence a smaller investment in receivables. The first term captures the speedup in collections, while the second reflects the reduced sales, and hence the lower receivables investment (at variable cost).

Note that V is included in the second term but not in the first one. The logic here is parallel to that with regard to Equation 27-1. V is included in the second term because, by shortening the credit period, Stylish Fashions will drive off some customers and lose sales of \$20,000 per year, or \$54.79 per day. The firm's investment in those sales was only 60 percent of the average receivables outstanding, or $0.6(30)(\$54.79) = \986 . However, the situation is different for the remaining customers. They would have paid their full purchase price—variable cost plus profit—after 30 days. Now, however, they will have to pay this amount 10 days sooner, so those funds will be available to meet operating costs or for investment. Thus, the first term should not be reduced by the variable cost factor. Therefore, in total, reducing the credit period would result in a \$4,548 reduction in the investment in receivables, consisting of a \$3,562 decline in receivables associated with continuing customers and a further \$986 decline in investment as a result of the reduced sales volume.

With the change in investment calculated, we can now analyze the profitability of the proposed change using Equation 27-3:

$$\begin{aligned}\Delta P &= (S_N - S_0)(1 - V) - r(\Delta I) - (B_N S_N - B_0 S_0) - (D_N S_N P_N - D_0 S_0 P_0) \\ &= (\$130,000 - \$150,000)(0.4) - 0.10(-\$4,548) \\ &\quad - [(0.02)(\$130,000) - (0.02)(\$150,000)] - \$0 \\ &= -\$8,000 + \$455 + \$400 = -\$7,145.\end{aligned}$$

Since the expected incremental pre-tax profits are negative, the firm should not reduce its credit period from 30 to 20 days.

Changes in Other Credit Policy Variables

In the preceding section, we examined the effects of changes in the credit period. Changes in other credit policy variables may be analyzed similarly. In general, we would follow these steps:

- STEP 1.** Estimate the effect of the policy change on sales, on DSO, on bad debt losses, and so on.
- STEP 2.** Determine the change in the firm's investment in receivables. If the change will increase sales, then use Equation 27-1 to calculate ΔI . Conversely, if the change will decrease sales, then use Equation 27-2.
- STEP 3.** Use Equation 27-3, or one of its variations, to calculate the effect of the change on pre-tax profits. If profits are expected to increase, the policy change should be made, unless it is judged to increase the firm's risk by a disproportionate amount.

Simultaneous Changes in Policy Variables

In the preceding discussion, we considered the effects of changes in only one credit policy variable. The firm could, of course, change several or even all policy variables simultaneously. An almost endless variety of equations could be developed, depending on which policy variables are manipulated and on the assumed effects on sales, discounts taken, the collection period, bad debt losses, the existence of excess capacity, changes in credit department costs, changes in the variable cost percentage, and so on. The analysis would get "messy," and the incremental profit equation would be complex, but the principles we have developed could be used to handle any type of policy change.

SELF-TEST QUESTIONS

- Describe the incremental analysis approach for evaluating a proposed credit policy change.
- How can risk be incorporated into the analysis?

THE COST OF BANK LOANS

In Chapter 22 we discussed the various short-term bank loans that are typically available: promissory notes, informal lines of credit, and revolving credit agreements. The cost of bank loans varies for different types of borrowers at any given point in time and for all borrowers over time. Interest rates are higher for riskier borrowers, and rates are also higher on smaller loans because of the fixed costs involved in making and servicing loans. If a firm can qualify as a "prime credit" because of its size and financial strength, it can borrow at the **prime rate**, which at

one time was the lowest rate banks charged. Rates on other loans are generally scaled up from the prime rate, but loans to very strong customers are now made at rates below prime. Thus, loans to smaller, riskier borrowers are generally stated to carry an interest rate of “prime *plus* some number of percentage points,” but loans to larger, less risky borrowers may have a rate stated as “prime *minus* some percentage points.”

Bank rates vary widely over time depending on economic conditions and Federal Reserve policy. When the economy is weak, then (1) loan demand is usually slack, (2) inflation is low, and (3) the Fed also makes plenty of money available to the system. As a result, rates on all types of loans are relatively low. Conversely, when the economy is booming, loan demand is typically strong, the Fed restricts the money supply, and the result is high interest rates. As an indication of the kinds of fluctuations that can occur, the prime rate during 1980 rose from 11 percent to 21 percent in just four months, and it rose from 6 to 9 percent during 1994. The prime rate is currently (July 2003) 4.00 percent. Interest rates on other bank loans also vary, generally moving with the prime rate.

The terms on a short-term bank loan to a business are spelled out in the promissory note. Here are the key elements contained in most promissory notes:

1. *Interest only versus amortized.* Loans are either *interest-only*, meaning that only interest is paid during the life of the loan, and the principal is repaid when the loan matures, or *amortized*, meaning that some of the principal is repaid on each payment date. Amortized loans are called *installment loans*. Note too that loans can be fully or partially amortized. For example, a loan may mature after 10 years, but payments may be based on 20 years, so an unpaid balance will still exist at the end of the 10th year. Such a loan is called a “balloon” loan.
2. *Collateral.* If a short-term loan is secured by some specific collateral, generally accounts receivable or inventories, this fact is indicated in the note. If the collateral is to be kept on the premises of the borrower, then a form called a *UCC-1* (Uniform Commercial Code-1) is filed with the secretary of the state in which the collateral resides, along with a *Security Agreement* (also part of the Uniform Commercial Code) that describes the nature of the agreement. These filings prevent the borrower from using the same collateral to secure loans from different lenders, and they spell out conditions under which the lender can seize the collateral.
3. *Loan guarantees.* If the borrower is a small corporation, its bank will probably insist that the larger stockholders *personally guarantee* the loan. Banks have often seen a troubled company’s owner divert assets from the company to some other entity he or she owned, so banks protect themselves by insisting on personal guarantees. However, stockholder guarantees are virtually impossible to get in the case of larger corporations that have many stockholders. Also, guarantees are unnecessary for proprietorships or partnerships because here the owners are already personally liable for the business’s debts.
4. *Nominal, or stated, interest rate.* The interest rate can be either *fixed* or *floating*. If it floats, it is generally indexed to the bank’s prime rate, to the T-bill rate, or to the London Inter-Bank Offer Rate (LIBOR). Most loans of any size (\$25,000 and up) have floating rates if their maturities are greater than 90 days. The note will also indicate whether the bank uses a *360-* or *365-day year* for purposes of calculating interest; most banks use a 360-day year.
5. *Frequency of interest payments.* If the note is on an interest-only basis, it will indicate *how frequently interest must be paid*. Interest is typically calculated on a daily basis but paid monthly.

6. *Maturity.* Long-term loans always have specific maturity dates. A short-term loan may or may not have a specified maturity. For example, a loan may mature in 30 days, 90 days, 6 months, or 1 year, or it may call for “payment on demand,” in which case the loan can remain outstanding as long as the borrower wants to continue using the funds and the bank agrees. Banks virtually never call demand notes unless the borrower’s creditworthiness deteriorates, so some “short-term loans” remain outstanding for years, with the interest rate floating with rates in the economy.
7. *Discount interest.* Most loans call for interest to be paid after it has been earned, but *discount loans* require that interest be paid in advance. If the loan is on a discount basis, the borrower actually receives less than the face amount of the loan, and this increases the loan’s effective cost. We discuss discount loans in a later section.
8. *Add-on basis installment loans.* Auto loans and other types of consumer installment loans are generally set up on an “add-on basis,” which means that interest over the life of the loan is calculated and then added to the face amount of the loan. Thus, the borrower signs a note for the funds received plus the interest. The add-on feature also raises the effective cost of a loan, as we demonstrate in a later section.
9. *Other cost elements.* As noted above, some loans require compensating balances, and revolving credit agreements often require commitment fees. Both of these conditions will be spelled out in the loan agreement, and both raise the effective cost of a loan above its stated nominal rate.
10. *Key-person insurance.* Often the success of a small company is linked to its owner or to a few important managers. It’s a sad fact, but many small companies fail when one of these key individuals dies. Therefore, banks often require small companies to take out *key-person insurance* on their most important managers as part of the loan agreement. Usually the loan becomes due and payable should there be an untimely demise, with the insurance benefits being used to repay the loan. This makes the best of a bad situation—the bank gets its money, and the company reduces its debt burden without having to use any of its operating cash.

Regular, or Simple, Interest

In this and the following sections, we explain how to calculate the effective cost of different bank loans. For illustrative purposes, we assume a loan of \$10,000 at a nominal interest rate of 12 percent, with a 365-day year.

For short-term business loans, the most common procedure is called **regular**, or **simple, interest**, based on an interest-only loan. We begin by dividing the nominal interest rate, 12 percent in this case, by 365 (or 360 in some cases) to get the rate per day:

$$\text{Interest rate per day} = \frac{\text{Nominal rate}}{\text{Days in year}} \quad (27-4)$$

$$= 0.12/365 = 0.00032876712.$$

This rate is then multiplied by the number of days during the specific payment period, and then by the amount of the loan. For example, if the loan is interest-only, with monthly payments, then the interest payment for January would be \$101.92:

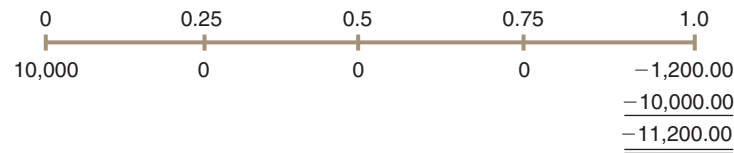
$$\text{Interest charge for period} = (\text{Days in period})(\text{Rate per day})(\text{Amount of loan}) \quad (27-5)$$

$$= (31 \text{ days})(0.00032876712)(\$10,000) = \$101.92.$$

If interest were payable quarterly, and if there were 91 days in the particular quarter, then the interest payment would be \$299.18. The annual interest would be $365 \times 0.00032876712 \times \$10,000 = \$1,200.00$. Note that if the bank had based the interest calculation on a 360-day year, as most banks do, the interest charges would have been slightly higher, and the annual charge would have been \$1,216.67. Obviously, banks use a 360-day year to boost their earnings.

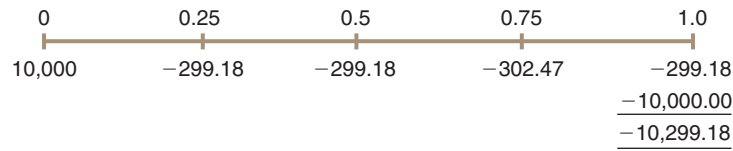
The effective interest rate on a loan depends on how frequently interest must be paid—the more frequently, the higher the effective rate. We demonstrate this point with two time lines, one for interest paid once a year and one for quarterly payments:

INTEREST PAID ANNUALLY:



The borrower gets \$10,000 at $t = 0$ and pays \$11,200 at $t = 1$. With a financial calculator, enter $N = 1$, $PV = 10000$, $PMT = 0$, and $FV = -11200$, and then press I to get the effective cost of the loan, 12 percent.

INTEREST PAID QUARTERLY:



Note that the third quarter has 92 days. We enter the data in the cash flow register of a financial calculator (being sure to use the +/- key to enter -299.18), and we find the periodic rate to be 2.9999 percent. The effective annual rate is 12.55 percent:

$$\text{Effective annual rate, quarterly} = (1 + 0.029999)^4 - 1 = 12.55\%$$

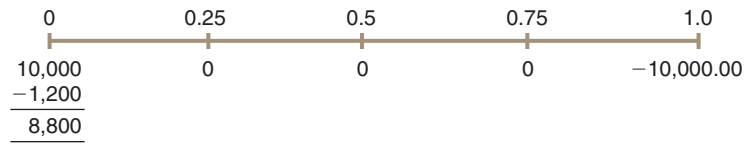
Had the loan called for interest to be paid monthly, the effective rate would have been 12.68 percent, and if interest had been paid daily, the rate would have been 12.75 percent. These rates would be higher if the bank used a 360-day year.

In these examples, we assumed that the loan matured in one year but that interest was paid at various times during the year. The rates we calculated would have been exactly the same as the ones above even if the loan had matured on each interest payment date. In other words, the effective rate on a monthly payment loan would be 12.68 percent regardless of whether it matured after one month, six months, one year, or 10 years, providing the stated rate remains at 12 percent.

Discount Interest

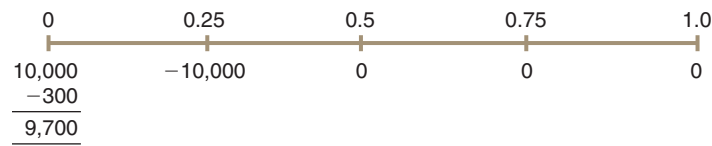
In a **discount interest** loan, the bank deducts the interest in advance (*discounts* the loan). Thus, the borrower receives less than the face value of the loan. On a one-year, \$10,000 loan with a 12 percent (nominal) rate, discount basis, the interest is $\$10,000(0.12) = \$1,200$. Therefore, the borrower obtains the use of only $\$10,000 - \$1,200 = \$8,800$. If the loan were for less than a year, the interest charge (the discount) would be lower; in our example, it would be \$600 if the loan were for six months, hence the amount received would be \$9,400.

The effective rate on a discount loan is always higher than the rate on an otherwise similar simple interest loan. To illustrate, consider the situation for a discounted 12 percent loan for one year:

DISCOUNT INTEREST, PAID ANNUALLY:

With a financial calculator, enter $N = 1$, $PV = 8800$, $PMT = 0$, and $FV = -10000$, and then press I to get the effective cost of the loan, 13.64 percent.⁶

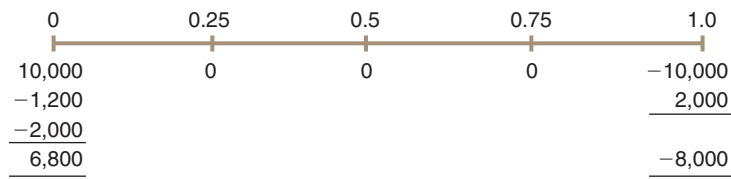
If a discount loan matures in less than a year, say, after one quarter, we have this situation:

DISCOUNT INTEREST, ONE QUARTER:

Enter $N = 1$, $PV = 9700$, $PMT = 0$, and $FV = -10000$, and then press I to find the periodic rate, 3.092784 percent per quarter, which corresponds to an effective annual rate of 12.96 percent. Thus, shortening the period of a discount loan lowers the effective rate of interest.

Effects of Compensating Balances

If the bank requires a compensating balance, and if the amount of the required balance exceeds the amount the firm would normally hold on deposit, then the excess must be deducted at $t = 0$ and then added back when the loan matures. This has the effect of raising the effective rate on the loan. To illustrate, here is the setup for a one-year discount loan, with a 20 percent compensating balance that the firm would not otherwise hold on deposit:

DISCOUNT INTEREST, PAID ANNUALLY, WITH 20 PERCENT COMPENSATING BALANCE:

Note that the bank initially gives, and the borrower gets, \$10,000 at time 0. However, the bank takes out the \$1,200 of interest in advance, and the company must

⁶Note that the firm actually receives less than the face amount of the loan:

$$\text{Funds received} = \text{Face amount of loan} (1.0 - \text{Nominal interest rate}).$$

We can solve for the face amount as follows:

$$\text{Face amount of loan} = \frac{\text{Funds received}}{1.0 - \text{Nominal rate (decimal)}}.$$

Therefore, if the borrowing firm actually requires \$10,000 of cash, it must borrow \$11,363.64:

$$\text{Face value} = \frac{\$10,000}{1.0 - 0.12} = \frac{\$10,000}{0.88} = \$11,363.64.$$

Now, the borrower will receive $\$11,363.64 - 0.12(\$11,363.64) = \$10,000$. Increasing the face value of the loan does not change the effective rate of 13.64 percent on the \$10,000 of usable funds.

leave \$2,000 in the bank as a compensating balance, hence the borrower's effective net cash flow at $t = 0$ is \$6,800. At $t = 1$, the borrower must repay the \$10,000, but \$2,000 is already in the bank (the compensating balance), so the company must repay a net amount of \$8,000.

With a financial calculator, enter $N = 1$, $PV = 6800$, $PMT = 0$, and $FV = -8000$, and then press I to get the effective cost of the discount loan with a compensating balance, 17.65 percent.

Installment Loans: Add-On Interest

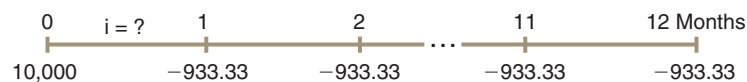
Lenders typically charge **add-on interest** on automobile and other types of installment loans. The term “add-on” means that the interest is calculated and then added to the amount received to determine the loan's face value. To illustrate, suppose you borrow \$10,000 on an add-on basis at a nominal rate of 12 percent to buy a car, with the loan to be repaid in 12 monthly installments. At a 12 percent add-on rate, you will pay a total interest charge of $\$10,000(0.12) = \$1,200$. However, since the loan is paid off in monthly installments, you have the use of the full \$10,000 for only the first month, and the outstanding balance declines until, during the last month, only $\frac{1}{12}$ of the original loan will still be outstanding. Thus, you are paying \$1,200 for the use of only about half the loan's face amount, as the average usable funds is only about \$5,000. Therefore, we can calculate the approximate annual rate as follows:

$$\text{Approximate annual rate}_{\text{Add-on}} = \frac{\text{Interest paid}}{(\text{Amount received})/2} \quad (27-6)$$

$$= \frac{\$1,200}{\$10,000/2} = 24.0\%.$$

To determine the effective rate of an add-on loan, we proceed as follows:

1. The total amount to be repaid is \$10,000 of principal, plus \$1,200 of interest, or \$11,200.
2. The monthly payment is $\$11,200/12 = \933.33 .
3. You are, in effect, paying off a 12-period annuity of \$933.33 in order to receive \$10,000 today, so \$10,000 is the present value of the annuity. Here is the time line:



4. With a financial calculator, enter $N = 12$, $PV = 10000$, $PMT = -933.33$, $FV = 0$, and then press I to obtain 1.7880 percent. However, this is a monthly rate.
5. The effective annual rate is found as follows:⁷

$$\begin{aligned} \text{Effective annual rate}_{\text{Add-on}} &= (1 + r_d)^n - 1.0 \\ &= (1.01788)^{12} - 1.0 \\ &= 1.2370 - 1.0 = 23.7\%. \end{aligned}$$

The **annual percentage rate (APR)**, which by law the bank is required to state in bold print on all “consumer loan” agreements, would be 21.46 percent:

⁷Note that if an installment loan is paid off ahead of schedule, additional complications arise. For the classic discussion of this point, see Dick Bonker, “The Rule of 78,” *Journal of Finance*, June 1976, 877–888.

$$\begin{aligned} \text{APR rate} &= (\text{Periods per year})(\text{Rate per period}) \\ &= 12(1.7880\%) = 21.46\%. \end{aligned}$$

Prior to the passage of the truth in lending laws in the 1970s, most banks would have called this a 12 percent loan, period. The truth in lending laws apply primarily to consumer as opposed to business loans.

SELF-TEST QUESTIONS

Name four different ways banks can calculate interest on loans. What is a compensating balance? What effect does a compensating balance requirement have on the effective interest rate on a loan?

CHOOSING A BANK

Individuals whose only contact with their bank is through the use of its checking services generally choose a bank for the convenience of its location and the competitive cost of its services. However, a business that borrows from banks must look at other criteria and recognize that important differences exist among banks. Some of these differences are considered next.

Willingness to Assume Risks

Banks have different basic policies toward risk. Some follow relatively conservative lending practices, while others engage in what are properly termed “creative banking practices.” These policies reflect partly the personalities of bank officers and partly the characteristics of the bank’s deposit liabilities. Thus, a bank with fluctuating deposit liabilities in a static community will tend to be a conservative lender, while a bank whose deposits are growing with little interruption may follow more liberal credit policies. Similarly, a large bank with broad diversification over geographic regions and across industries can obtain the benefit of combining and averaging risks. Thus, marginal credit risks that might be unacceptable to a small or specialized bank can be pooled by a branch banking system to reduce the overall risk of a group of marginal accounts.⁸

Advice and Counsel

Some bank loan officers are active in providing counsel and in granting loans to firms in their early and formative years. Certain banks have specialized departments that make loans to firms expected to grow and thus to become more important customers. The personnel of these departments can provide valuable counseling to customers: The bankers’ experience with other firms in growth situations may enable them to spot, and then to warn their customers about, developing problems.

Loyalty to Customers

Banks differ in their support of borrowers in bad times. This characteristic is referred to as the degree of *loyalty* of the bank. Some banks may put great pressure

⁸Bank deposits are insured by a federal agency, and banks are required to pay premiums to cover the cost of this insurance. Logically, riskier banks should pay higher premiums, but to date political forces have limited the use of risk-based insurance premiums. As an alternative, banks with riskier loan portfolios are required to have more equity capital per dollar of deposits than less risky banks. The savings and loan industry, until the 1980s, had federal insurance, no differential capital requirements, and lax regulations. As a result, some S&L operators wrote very high interest rate, but very risky, loans using low-cost, insured deposits. If the loans paid off, the S&L owners would get rich. If they went into default, the taxpayers would have to pay off the deposits. Those government policies ended up costing taxpayers more than \$100 billion.

on a business to liquidate its loans when the firm's outlook becomes clouded, whereas others will stand by the firm and work diligently to help it get back on its feet. An especially dramatic illustration of this point was Bank of America's bailout of Memorex Corporation. The bank could have forced Memorex into bankruptcy, but instead it loaned the company additional capital and helped it survive a bad period. Memorex's stock price subsequently rose from \$1.50 to \$68, so Bank of America's help was indeed beneficial.

Specialization

Banks differ greatly in their degrees of loan specialization. Larger banks have separate departments that specialize in different kinds of loans—for example, real estate loans, farm loans, and commercial loans. Within these broad categories, there may be a specialization by line of business, such as steel, machinery, cattle, or textiles. The strengths of banks are also likely to reflect the nature of the businesses and the economic environment in the areas in which they operate. For example, some California banks have become specialists in lending to electronics companies, while many Midwestern banks are agricultural specialists. A sound firm can obtain more creative cooperation and more active support by going to a bank that has experience and familiarity with its particular type of business. Therefore, a bank that is excellent for one firm may be unsatisfactory for another.

Maximum Loan Size

The size of a bank can be an important factor. Since the maximum loan a bank can make to any one customer is limited to 15 percent of the bank's capital accounts (capital stock plus retained earnings), it is generally not appropriate for large firms to develop borrowing relationships with small banks.

Merchant Banking

The term "merchant bank" was originally applied to banks that not only made loans but also provided customers with equity capital and financial advice. Prior to 1933, U.S. commercial banks performed all types of merchant banking functions. However, about one-third of the U.S. banks failed during the Great Depression, in part because of these activities, so in 1933 the Glass-Steagall Act was passed in an effort to reduce banks' exposure to risk. In recent years, commercial banks have been attempting to get back into merchant banking, in part because their foreign competitors offer such services, and U.S. banks compete with foreign banks for multinational corporations' business. Currently, the larger banks, often through subsidiaries that engage in investment banking activities, are being permitted to get back into merchant banking, at least to a limited extent. This trend will probably continue, and if it does, corporations will need to consider a bank's ability to provide a full range of commercial and merchant banking services when choosing a bank.

Other Services

Banks also provide cash management services, assist with electronic funds transfers, help firms obtain foreign exchange, and the like, and the availability of such services should be taken into account when selecting a bank. Also, if the firm is a small business whose manager owns most of its stock, the bank's willingness and ability to provide trust and estate services should be considered.

SELF-TEST QUESTION

What are some factors that should be considered when choosing a bank?

SUMMARY

This chapter discussed granting credit and the conventions for interest rates on bank loans. It is important to monitor the results of credit policy by monitoring accounts receivable. A firm can affect its level of accounts receivable by changing its credit and collections policy, but doing so also affects sales. Therefore, a complete analysis of the effects of changes in credit policy is necessary. The key concepts covered are listed below:

- A firm's credit policy consists of four elements: (1) **credit period**, (2) **discounts** given for early payment, (3) **credit standards**, and (4) **collection policy**. The first two, when combined, are called the **credit terms**.
- Additional factors that influence a firm's overall credit policy are (1) **profit potential** and (2) **legal considerations**.
- The basic objective of the credit manager is to increase profitable sales by extending credit to worthy customers and therefore adding value to the firm.
- Firms can use **days sales outstanding (DSO)** and **aging schedules** to help monitor their receivables position, but the best way to monitor aggregate receivables is the **payments pattern approach**. The primary tool in this approach is the **uncollected balances schedule**.
- If a firm **eases its credit policy** by lengthening the credit period, relaxing its credit standards and collection policy, and offering (or raising) its cash discount, its sales should increase. However, its costs will also increase. A firm should ease its credit policy only if the costs of doing so will be offset by higher expected revenues. In general, credit policy changes should be evaluated on the basis of incremental profits.
- Changes in credit policy can be analyzed in two ways. First, **pro forma income statements** can be constructed for both the current and the proposed policies. Second, equations can be used to estimate the **incremental change** in profits resulting from a proposed new credit policy.
- With a **regular**, or **simple**, **interest** loan interest is not compounded; that is, interest is not earned on interest.
- In a **discount interest** loan, the bank deducts the interest in advance. Interest is calculated on the face amount of the loan but it is paid in advance.
- Installment loans are typically **add-on interest** loans. Interest is calculated and added to the funds received to determine the face amount of the loan.
- The **annual percentage rate (APR)** is a rate reported by banks and other lenders on loans when the effective periodic rate exceeds the nominal periodic rate of interest.

QUESTIONS

- (27-1) Define each of the following terms:
- a. Cash discounts
 - b. Seasonal dating
 - c. Aging schedule; days sales outstanding (DSO)
 - d. Payments pattern approach, uncollected balances schedule
 - e. Simple interest; discount interest, add-on interest
- (27-2) Suppose that a firm makes a purchase and receives the shipment on February 1. The terms of trade as stated on the invoice read "2/10, net 40, May 1 dating." What is the latest date on which payment can be made and the discount still be taken? What is the date on which payment must be made if the discount is not taken?
- (27-3) Is it true that if a firm calculates its days sales outstanding, it has no need for an aging schedule?

- (27-4) Firm A had no credit losses last year, but 1 percent of Firm B's accounts receivable proved to be uncollectible and resulted in losses. Should Firm B fire its credit manager and hire A's?
- (27-5) Indicate by a (+), (-), or (0) whether each of the following events would probably cause accounts receivable (A/R), sales, and profits to increase, decrease, or be affected in an indeterminate manner:

	A/R	Sales	Profits
The firm tightens its credit standards.	_____	_____	_____
The terms of trade are changed from 2/10, net 30, to 3/10, net 30.	_____	_____	_____
The terms are changed from 2/10, net 30, to 3/10, net 40.	_____	_____	_____
The credit manager gets tough with past-due accounts.	_____	_____	_____

PROBLEMS

(27-1) Relaxing Collection Efforts The Boyd Corporation has annual credit sales of \$1.6 million. Current expenses for the collection department are \$35,000, bad debt losses are 1.5 percent, and the days sales outstanding is 30 days. The firm is considering easing its collection efforts such that collection expenses will be reduced to \$22,000 per year. The change is expected to increase bad debt losses to 2.5 percent and to increase the days sales outstanding to 45 days. In addition, sales are expected to increase to \$1,625,000 per year.

Should the firm relax collection efforts if the opportunity cost of funds is 16 percent, the variable cost ratio is 75 percent, and taxes are 40 percent?

(27-2) Tightening Credit Terms Kim Mitchell, the new credit manager of the Vinson Corporation, was alarmed to find that Vinson sells on credit terms of net 90 days while industrywide credit terms have recently been lowered to net 30 days. On annual credit sales of \$2.5 million, Vinson currently averages 95 days of sales in accounts receivable. Mitchell estimates that tightening the credit terms to 30 days would reduce annual sales to \$2,375,000, but accounts receivable would drop to 35 days of sales and the savings on investment in them should more than overcome any loss in profit.

Vinson's variable cost ratio is 85 percent, and taxes are 40 percent. If the interest rate on funds invested in receivables is 18 percent, should the change in credit terms be made?

(27-3) Monitoring of Receivables The Russ Fogler Company, a small manufacturer of cordless telephones, began operations on January 1, 2004. Its credit sales for the first 6 months of operations were as follows:

Month	Credit Sales
January	\$ 50,000
February	100,000
March	120,000
April	105,000
May	140,000
June	160,000

Throughout this entire period, the firm's credit customers maintained a constant payments pattern: 20 percent paid in the month of sale, 30 percent paid in the month following the sale, and 50 percent paid in the second month following the sale.

- a. What was Fogler's receivables balance at the end of March and at the end of June?

- b. Assume 90 days per calendar quarter. What were the average daily sales (ADS) and days sales outstanding (DSO) for the first quarter and for the second quarter? What were the cumulative ADS and DSO for the first half-year?
- c. Construct an aging schedule as of June 30. Use account ages of 0–30, 31–60, and 61–90 days.
- d. Construct the uncollected balances schedule for the second quarter as of June 30.

(27-4) On March 1, Minnerly Motors obtained a business loan from a local bank. The loan is a \$25,000 interest-only loan with a nominal rate of 11 percent. Interest is calculated on a simple interest basis with a 365-day year. What is Minnerly's interest charge for the first month (assuming 31 days in the month)?

(27-5) Mary Jones recently obtained an equipment loan from a local bank. The loan is for \$15,000 with a nominal interest rate of 11 percent. However, this is an installment loan, so the bank also charges add-on interest. Mary must make monthly payments on the loan, and the loan is to be repaid in 1 year. What is the effective annual rate on the loan (assuming a 365-day year)?

(27-6) Del Hawley, owner of Hawley's Hardware, is negotiating with First City Bank for a 1-year loan of \$50,000. First City has offered Hawley the following alternatives. Calculate the effective annual interest rate for each alternative. Which alternative has the lowest effective annual interest rate?

- a. A 12 percent annual rate on a simple interest loan, with no compensating balance required and interest due at the end of the year.
- b. A 9 percent annual rate on a simple interest loan, with a 20 percent compensating balance required and interest due at the end of the year.
- c. An 8.75 percent annual rate on a discounted loan, with a 15 percent compensating balance.
- d. Interest is figured as 8 percent of the \$50,000 amount, *payable at the end of the year*, but the \$50,000 is repayable in monthly installments during the year.

(27-7) The D. J. Masson Corporation needs to raise \$500,000 for 1 year to supply working capital to a new store. Masson buys from its suppliers on terms of 3/10, net 90, and it currently pays on the 10th day and takes discounts, but it could forgo discounts, pay on the 90th day, and get the needed \$500,000 in the form of costly trade credit. Alternatively, Masson could borrow from its bank on a 12 percent discount interest rate basis. What is the effective annual interest rate of the lower cost source?

(27-8) Yonge Corporation must arrange financing for its working capital requirements for the coming year. Yonge can (a) borrow from its bank on a simple interest basis (interest payable at the end of the loan) for 1 year at a 12 percent nominal rate; (b) borrow on a 3-month, but renewable, loan basis at an 11.5 percent nominal rate; (c) borrow on an installment loan basis at a 6 percent add-on rate with 12 end-of-month payments; or (d) obtain the needed funds by no longer taking discounts and thus increasing its accounts payable. Yonge buys on terms of 1/15, net 60. What is the effective annual cost (*not* the nominal cost) of the *least expensive* type of credit, assuming 360 days per year?

(27-9) Gifts Galore Inc. borrowed \$1.5 million from National City Bank. The loan was made at a simple annual interest rate of 9 percent a year for 3 months. A 20 percent compensating balance requirement raised the effective interest rate.

- a. The nominal annual rate on the loan was 11.25 percent. What is the true effective rate?
- b. What would be the effective cost of the loan if the note required discount interest?
- c. What would be the nominal annual interest rate on the loan if the bank did not require a compensating balance but required repayment in 3 equal monthly installments?

(27-10) **Short-Term Financing Analysis** Malone Feed and Supply Company buys on terms of 1/10, net 30, but it has not been taking discounts and has actually been paying in 60 rather than 30 days. Assume that the accounts payable are recorded at full cost, not net of discounts. Malone's balance sheet follows (thousands of dollars):

Cash	\$ 50	Accounts payable	\$ 500
Accounts receivable	450	Notes payable	50
Inventory	<u>750</u>	Accruals	<u>50</u>
Current assets	\$1,250	Current liabilities	\$ 600
		Long-term debt	150
Fixed assets	<u>750</u>	Common equity	<u>1,250</u>
Total assets	<u>\$2,000</u>	Total liabilities and equity	<u>\$2,000</u>

Now, Malone's suppliers are threatening to stop shipments unless the company begins making prompt payments (that is, paying in 30 days or less). The firm can borrow on a 1-year note (call this a current liability) from its bank at a rate of 15 percent, discount interest, with a 20 percent compensating balance required. (Malone's \$50,000 of cash is needed for transactions; it cannot be used as part of the compensating balance.)

- How large would the accounts payable balance be if Malone takes discounts? If it does not take discounts and pays in 30 days?
- How large must the bank loan be if Malone takes discounts? If Malone doesn't take discounts?
- What are the nominal and effective costs of nonfree trade credit? What is the effective cost of the bank loan? Based on these costs, what should Malone do?
- Assume that Malone forgoes the discount and borrows the amount needed to become current on its payables. Construct a pro forma balance sheet based on this decision. (Hint: You will need to include an account called "prepaid interest" under current assets.)
- Now assume that the \$500,000 shown on the balance sheet is recorded net of discounts. How much would Malone have to pay its suppliers to reduce its accounts payables to \$250,000? If Malone's tax rate is 40 percent, what is the effect on its net income due to the lost discount when it reduces its accounts payable to \$250,000? How much would Malone have to borrow? (Hint: Malone will receive a tax deduction due to the lost discount, which will affect the amount it must borrow.) If Malone's tax rate is 40 percent, what is the effect on its net income due to the lost discount when it reduces its accounts payable to \$250,000? Construct a pro forma balance sheet based on this scenario. (Hint: You will need to include an account called "prepaid interest" under current assets and adjust retained earnings by the after-tax amount of the lost discount.)

(27-11) **Alternative Financing Arrangements** Suncoast Boats Inc. estimates that because of the seasonal nature of its business, it will require an additional \$2 million of cash for the month of July. Suncoast Boats has the following 4 options available for raising the needed funds:

- Establish a 1-year line of credit for \$2 million with a commercial bank. The commitment fee will be 0.5 percent per year on the unused portion, and the interest charge on the used funds will be 11 percent per annum. Assume that the funds are needed only in July and that there are 30 days in July and 360 days in the year.
- Forgo the trade discount of 2/10, net 40, on \$2 million of purchases during July.
- Issue \$2 million of 30-day commercial paper at a 9.5 percent per annum interest rate. The total transaction fee, including the cost of a backup credit line, on using commercial paper is 0.5 percent of the amount of the issue.

- (4) Issue \$2 million of 60-day commercial paper at a 9 percent per annum interest rate, plus a transaction fee of 0.5 percent. Since the funds are required for only 30 days, the excess funds (\$2 million) can be invested in 9.4 percent per annum marketable securities for the month of August. The total transactions cost of purchasing and selling the marketable securities is 0.4 percent of the amount of the issue.
- What is the dollar cost of each financing arrangement?
 - Is the source with the lowest expected cost necessarily the one to select? Why or why not?

SPREADSHEET PROBLEM

Build a Model: Short-Term
Financing Analysis



e-resource

(27-12) Start with the partial model in the file *FM11 Ch 27 P12 Build a Model.xls* from the textbook's Web site. Rework parts a through d of Problem 27-10 using a spreadsheet model. Then answer the following related question.

- Do a sensitivity analysis that shows how the size of the bank loan would vary with changes in the interest rate and the compensating balance percentage, using interest rates in the range of 5 to 25 percent and compensating balances in the range of 0 to 30 percent.

CYBERPROBLEM

Please go to our Web site, <http://brigham.swlearning.com>, to access any Cyberproblems.

THOMSON ONE Business School Edition

Please go to <http://brighamxtra.swlearning.com> to access any Thomson ONE problems.

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. Sales would be slow during the cold months, rise during the spring, and then fall off again in the summer, when new construction in the area slows. Sales estimates for the first 6 months are as follows (in thousands of dollars):

January	\$100	March	\$300	May	\$200
February	200	April	300	June	100

The terms of sale are net 30, but because of special incentives, the brothers expect 30 percent of the customers (by dollar value) to pay on the 10th day following the sale, 50 percent to pay on the 40th day, and the remaining 20 percent 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.

- Discuss, in general, what it means for the brothers to set a credit and collections policy.
- 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.)
 - What is the firm's expected days sales outstanding (DSO)?
 - What is its expected average daily sales (ADS)?
 - What is its expected average accounts receivable level?

- (4) Assume that the firm's profit margin is 25 percent. 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 percent profit margin was calculated.
- (5) If bank loans have a cost of 12 percent, what is the annual dollar cost of carrying the receivables?
- c. What are some factors that influence (1) a firm's receivables level and (2) the dollar cost of carrying 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 percent of the firm's customers pay in the month of sale, 50 percent pay in the month following the sale, and the remaining 20 percent 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:

Month	Sales	End-of-Month Receivables	QUARTERLY		DSO = (A/R)(ADS)
			Sales	Ads	
January	\$100	\$ 70			
February	200	160			
March	300	250	\$600	\$6.67	37.5
April	300				
May	200				
June	100				

- 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? Is DSO a good management tool in this situation? If not, why not?
- f. Construct aging schedules for the end of March and the end of June (use the format given below). Do these schedules properly measure customers' payment patterns? If not, why not?

Age of Account (Days)	MARCH		JUNE	
	A/R	%	A/R	%
0-30	\$210	84%		
31-60	40	16		
61-90	<u>0</u>	<u>0</u>	<u>—</u>	<u>—</u>
	<u>\$250</u>	<u>100%</u>	<u>—</u>	<u>—</u>

- g. Construct the uncollected balances schedules for the end of March and the end of June. Use the format given below. Do these schedules properly measure customers' payment patterns?

Month	MARCH			Month	JUNE		
	Sales	Contribution to A/R	A/R-to-Sales Ratio		Sales	Contribution to A/R	A/R-to-Sales Ratio
January	\$100	\$ 0	0%	April			
February	200	40	20	May			
March	300	<u>210</u>	<u>70</u>	June		<u>—</u>	<u>—</u>
		<u>—</u>	<u>—</u>			<u>—</u>	<u>—</u>

- h. Assume that it is now July of Year 1, and the brothers are developing pro forma financial statements for the following year. Further, assume that sales and collections in the first half-year matched the predicted levels. Using the Year 2 sales forecasts as shown next, what are next year's pro forma receivables levels for the end of March and for the end of June?

Month	Predicted Sales	Predicted A/R-to-Sales Ratio	Predicted Contribution to Receivables
January	\$150	0%	\$ 0
February	300	20	60
March	500	70	<u>350</u>
		Projected March 31 A/R balance =	<u><u>\$410</u></u>
April	\$400		
May	300		
June	200		
		Projected June 30 A/R balance =	<u> </u>

- i. 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 they are supposed to pay the full amount in 30 days. Gross sales are now running \$1,000,000 a year, and 80 percent (by dollar volume) of the firm's *paying* customers generally pay the full amount on Day 30, while the other 20 percent pay, on average, on Day 40. Two percent of the firm's gross sales 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 vigor than in the past. Thus, cash customers and those paying within 10 days would receive a 2 percent 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 percent of the paying customers to take the discount and pay on the 10th day; for 30 percent to pay the full amount on Day 20; for 10 percent to pay late on Day 30; and for bad debt losses to fall from 2 percent to 1 percent of gross sales. The firm's operating cost ratio will remain unchanged at 75 percent, and its cost of carrying receivables will remain unchanged at 12 percent.

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 h to answer parts i through q.

- j. 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?
- k. What is the dollar amount of the firm's current bad debt losses? What losses would be expected under the new policy?
- l. What would be the firm's expected dollar cost of granting discounts under the new policy?
- m. What is the firm's current dollar cost of carrying receivables? What would it be after the proposed change?
- n. 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 percent.)
- o. 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 post-tax profitability?

	New	Old	Difference
Gross sales		\$1,000,000	
Less discounts		0	
Net sales		\$1,000,000	
Production costs		750,000	
Profit before credit costs and taxes		\$ 250,000	
Credit-related costs:			
Carrying costs		8,000	
Bad debt losses		20,000	
Profit before taxes		\$ 222,000	
Taxes (40%)		88,800	
Net income		\$ 133,200	

- p. The brothers are considering taking out a 1-year bank loan for \$100,000 to finance part of their working capital needs and have been quoted a rate of 8 percent. What is the effective annual cost rate assuming (1) simple interest, (2) discount interest, (3) discount interest with a 10 percent compensating balance, and (4) add-on interest on a 12-month installment loan? For the first 3 of these assumptions, would it matter if the loan were for 90 days, but renewable, rather than for a year?
- q. How large would the loan actually be in each of the cases in part p?

SELECTED ADDITIONAL REFERENCES AND CASES

The following articles provide more information on short-term financial management:

Gentry, James A., "State of the Art of Short-Run Financial Management," *Financial Management*, Summer 1988, 41–57.

—, and Jesus M. De La Garza, "Monitoring Accounts Payables," *Financial Review*, November 1990, 559–576.

Articles that address credit policy and receivables management include the following:

Gallinger, George W., and A. James Ifflander, "Monitoring Accounts Receivable Using Variance Analysis," *Financial Management*, Winter 1986, 69–76.

Gentry, James A., and Jesus M. De La Garza, "A Generalized Model for Monitoring Accounts Receivable," *Financial Management*, Winter 1985, 28–38.

Mian, Shehzad L., and Clifford W. Smith, "Extending Trade Credit and Financing Receivables," *Journal of Applied Corporate Finance*, Spring 1994, 75–84.

Sachdeva, Kanwal S., and Lawrence J. Gitman, "Accounts Receivable Decisions in a Capital Budgeting Framework," *Financial Management*, Winter 1981, 45–49.

Weston, J. Fred, and Pham D. Tuan, "Comment on Analysis of Credit Policy Changes," *Financial Management*, Winter 1980, 59–63.

For a discussion of effective yields, see

Finnerty, John D., "Bank Discount, Coupon Equivalent, and Compound Yields: Comment," *Financial Management*, Summer 1983, 40–44.

Glasgo, Philip W., William J. Landes, and A. Frank Thompson, "Bank Discount, Coupon Equivalent, and Compound Yields," *Financial Management*, Autumn 1982, 82–84.

The following cases from the Finance Online Case Library cover many of the concepts discussed in this chapter and are available at <http://www.textchoice.com>:

Case 33, "Upscale Toddlers, Inc.," which deals with credit policy changes.

Case 34, "Texas Rose Company," which focuses on receivables management.

Case 62, "Western Supply Company," which illustrates the effects of a change in credit policy on corporate profitability and cash flow.