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20 Short-Term Financing

"If you would know the value of money try to borrow some."

—Benjamin Franklin

Cash 'Til Payday®

Loan Mart is one of the companies offering so-called payday loans. These loans are popular with some working people who need cash for a few weeks until payday.

In a typical transaction the borrower makes out a check to the lender dated two weeks hence. The lender then cashes the check on the specified date, which is typically after the borrower's payday. The lender provides cash to the borrower in exchange for this post-dated check.

Loan Mart charges the borrower a "fee" in the amount of $20 per $100 borrowed. This is for a loan that is repaid in two weeks.

If the $20 fee were considered to be interest, this would be an effective annual interest rate of 11,348% on a $100 loan. The interest rate on your Visa or Mastercard doesn't look too bad in comparison, does it? Read this chapter to see how the effective annual interest rate was calculated.

Source: Terms posted at Loan Mart, Fort Collins, Colorado.

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Chapter Overview

The credit card is perhaps the best-known source of short-term financing. However, businesses use many other types of short-term financing to sustain their business operations. In this chapter we discuss the advantages and disadvantages of short-term financing, sources of that financing, and methods for calculating the cost of each source. We also show how loan terms can affect a loan's effective interest rate, and how accounts receivable and inventory can be used as short-term loan collateral.

Learning Objectives

After reading this chapter, you should be able to:

1. Explain the need for short-term financing.
2. List the advantages and disadvantages of short-term financing.
3. Describe three types of short-term financing.
4. Compute the cost of trade credit and commercial paper.
5. Calculate the cost of a loan and explain how loan terms affect the effective interest rate.
6. Describe how accounts receivable and inventory can be used as collateral for short-term loans.

The Need for Short-Term Financing

Businesses rely on short-term financing from external sources for two reasons. The first is growth—profits may simply not be high enough to keep up with the rate at which the company is buying new assets. Imagine a convenience store chain that wished to open one new store a month. If each new store cost $100,000, the company would have to be very profitable to be able to do this without obtaining external financing.

The second reason that businesses rely on external short-term financing is choice. Rather than waiting to save enough money from net profits to make their desired purchases, many firms would rather borrow the money at the outset and make their purchases on time. People make the same choices in their personal lives. For example, you could save a little money each month until you saved enough

to buy a car with cash. This might take a long time, however, and in the meantime you would be without transportation. Alternatively, you could borrow the money to buy the car and have it to drive around while you're paying off the loan. People—and businesses—often choose the latter alternative.

Clearly, the ability to obtain external financing is crucial for most businesses. Without it, most businesses could never even get started.

Interactive Module

Go to Downloadable Companion Material, chapter 20. Follow the instructions there. Do you believe that people who obtain "payday loans" know or care about the effective annual rates they are paying? Why or why not?

Short-Term Financing versus Long-Term Financing

Two factors influence the duration of external financing that businesses seek. The first, of course, is availability. A firm may want to take out a 10-year loan to finance its inventory purchases, but it may find no one willing to make such a loan. In general, businesses can usually find financing for short time periods. It is more difficult to find long-term financing.

The second factor influencing the length of time that firms finance for is the risk–return, or liquidity–profitability, trade-off discussed in Chapter 17.

In the context of financing alternatives, here is how the trade-off works:

- *Short-term financing* is usually cheaper than long-term financing because short-term interest rates are normally lower than long-term interest rates.[1] Therefore, the desire for profitability (return) pushes firms toward short-term financing.
- *Long-term financing* is regarded as less risky than short-term financing for the borrower because the borrower locks in the agreed-on interest rate for a long period of time. No matter how interest rates change during the life of the loan, the borrower's interest costs are certain. Furthermore, the borrower does not have to incur the transaction costs of obtaining new financing every few months. So, the desire to avoid risk encourages firms to use long-term financing.

The length of time that firms finance for depends on whether they want "to eat well or to sleep well."[2] Returns generally increase as financing maturities grow shorter, but so does risk. Risk decreases as financing maturities grow longer, but so do returns. The blend of financing maturities that a firm selects reflects how aggressive or conservative the firm's managers are.

Figure 20-1 summarizes the factors that influence the sources of external financing. External financing can come from short-term or long-term sources. We discuss short-term financing sources next.

Short-Term Financing Alternatives

When most businesses need money for a short time—that is, for less than one year—they usually turn to two sources: short-term loans and trade credit (the process of delaying payments to suppliers). Large, well-established businesses may make use of a third financing source: commercial paper. In the sections that follow, we discuss the various aspects of obtaining money from these three sources.

[1]Remember from Chapter 2 that a normal yield curve is upward sloping.

[2]The phrase is adapted from a remark by J. Kenfield Morley, who said, "In investing money, the amount of interest you want should depend on whether you want to eat well or sleep well."

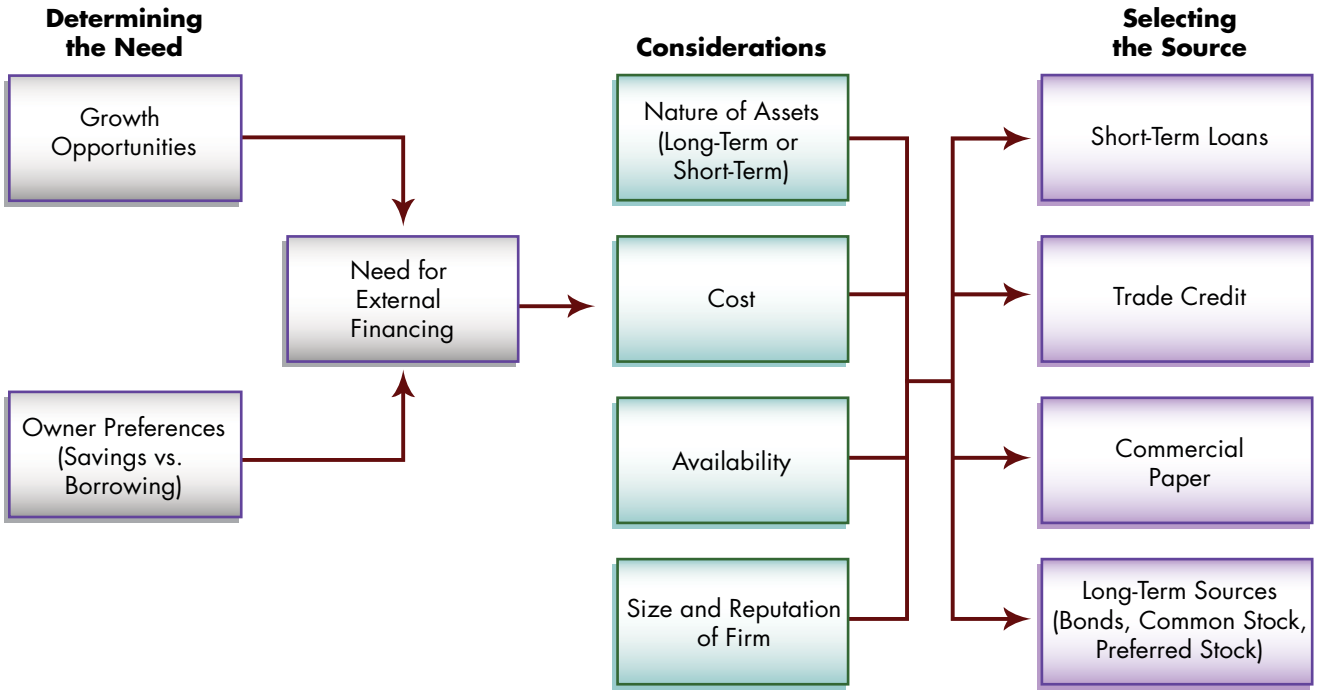

Figure 20-1
The External Financing Source-Selection Process

The flowchart illustrates the external financing source-selection process. A firm determines the need for external financing, and then considers several factors before selecting the short-term financing sources.

Short-Term Loans from Banks and Other Institutions

Financial institutions offer businesses many types of short-term loans. No matter what the type of loan, however, the cost to a borrower is usually measured by the percent interest rate charged by the lender. The annual interest rate that reflects the dollars of interest paid divided by the dollars borrowed is the **effective interest rate**.

Often, the effective interest rate differs from the interest rate advertised by the bank, which is known as the **stated interest rate**.

Two common types of short-term loans are the *self-liquidating loan* and the *line of credit*. We examine these loan alternatives next. No matter what type of loan a firm uses, the firm must sign a promissory note. A **promissory note** is the legal instrument that the borrower signs and is the evidence of the lender's claim on the borrower.

Self-Liquidating Loans Many of the short-term loans obtained from banks are self-liquidating. A **self-liquidating loan** is one in which the proceeds of the loan are used to acquire assets that will generate enough cash to repay the loan. An example is a loan used to finance a seasonal increase in inventory, such as the purchase of swimwear to sell during the summer months. The sale of the inventory generates enough cash to repay the loan.

The Line of Credit As we now know, each time a firm borrows money from a bank, it signs a promissory note. However, a firm may have more than one promissory note outstanding at any one time. Indeed, a firm could have a substantial number of promissory notes outstanding, all with overlapping terms of payment. To keep loans under control, banks may specify the maximum total balance that firms may have in outstanding

short-term loans. A **line of credit** is the borrowing limit a bank sets for a firm. A line of credit is an informal arrangement. The bank may change a firm's credit limit or withdraw it entirely at any time. This may happen when business conditions change, but the bank doesn't need a reason to reduce or eliminate a firm's line of credit.

In contrast, a *revolving credit agreement* is a formal agreement between a bank and a borrower to extend credit to a firm up to a certain amount for some period of time (which may be for several years). The agreements are usually set forth in a written contract, and firms generally pay a fee for the revolving credit.

Trade Credit

When a company purchases materials, supplies, or services on credit instead of paying cash, that frees up funds to be used elsewhere, just as if the funds had been borrowed from a bank. Trade credit is the act of obtaining funds by delaying payment to suppliers. The longer a company delays paying for purchases, the more trade credit the firm is said to be using.

Even though trade credit is obtained by simply delaying payment to suppliers, it is not always free. Next, we explain the cost of trade credit and how to compute that cost so it can be compared to the cost of a bank loan or other credit source.

Computing the Cost of Trade Credit If a supplier charges a firm interest on credit balances, then computing the cost of trade credit is easy—simply read the interest rate charges on the supplier's account statements, much as we would read a credit card's interest charges.

Most wholesale suppliers, however, do not charge interest on credit balances. Instead, they simply give their customers so many days to pay and offer them a discount on the amount of the purchase if they pay early. A typical example of such credit terms is 2/10, n30—if customers pay their bills within 10 days of the invoice date, they will receive a 2 percent discount; if not, the net amount of the bill is due within 30 days.[3] Figure 20-2 diagrams a purchaser's payment deadlines for a $100 purchase on credit terms of 2/10, n30.

We see from Figure 20-2 that if a firm takes the discount, it can obtain the use of $98 for up to 10 days without any cost. In this case the trade credit the firm receives is free. But suppose a firm doesn't take the discount? Look at Figure 20-2 again and think of the situation this way: Instead of paying $98 on the tenth day, the firm can pay $98 anytime during the next 20 days as long as it pays a "fee" of $2 for delaying payment. In essence, the firm is "borrowing" $98 for 20 days at a cost of $2. Assuming the firm pays its bill on day 30, we can compute the effective annual interest rate of the trade credit using the following equation:

[3]Credit terms of this type were introduced in Chapter 19 from the point of view of the supplier granting the credit. Here, we discuss the terms from the purchaser's point of view.

Figure 20-2 Payment Schedule with 2/10, n30 Credit Terms

Figure 20-2 shows the purchaser's payment schedule for a $100 purchase from a supplier who offfers 2/10, n30 credit terms.

Trade Credit Effective Interest Rate Formula

$$k = \left[1 + \frac{\text{Discount \%}}{100 - \text{Discount \%}}\right]^{\frac{365}{\text{Days to Pay} - \text{Discount Period}}} - 1 \qquad (20\text{-}1)$$

where: k = Cost of trade credit expressed as an effective annual interest rate

Discount % = Percentage discount being offered

Days to Pay = Time between the day of the credit purchase and the day the firm must pay its bill

Discount Period = Number of days in the discount period

The 365 in the equation represents the number of days in a year. We also multiply the result, k, by 100 to express it as a percentage.

In our example, the discount percentage is 2 percent, the total number of days to pay is 30, and the number of days in the discount period is 10. We use Equation 20-1 to solve for k as follows:

$$k = \left[1 + \frac{2}{100 - 2}\right]^{\frac{365}{30 - 10}} - 1$$

$$= (1 + .020408)^{(18.25)} - 1$$

$$= (1.020408)^{(18.25)} - 1$$

$$= 1.4458 - 1$$

$$= .4458, \text{ or } 44.58\%$$

As the calculation shows, the firm's trade credit—the use of $98 for an additional 20 days—costs the firm an effective annual percentage rate of interest of nearly 45 percent! Why would any reasonable financial manager pay such high rates? Most reasonable financial managers wouldn't, unless very unfavorable circumstances forced them to or they didn't realize they were doing it.

Instead, because bank loan rates are usually much lower than 45 percent, most reasonable financial managers would borrow $98 from the bank and use it to pay the supplier on the tenth day to take advantage of the discount. Twenty days later, the financial manager would repay the loan plus the interest charges, which would be considerably less than $2. Either way, a firm can obtain the use of $98 for 20 days, but borrowing from a bank is usually the much cheaper alternative.

Commercial Paper

Firms can sell **commercial paper**—unsecured notes issued by large, very creditworthy firms for up to 270 days—to obtain cash. Selling commercial paper is usually a cheaper alternative to getting a short-term loan from a bank. Remember that only large, creditworthy corporations sell commercial paper because only they can attract investors who will lend them money for lower rates than banks charge for short-term loans.

Calculating the Cost of Commercial Paper Commercial paper is quoted on a *discount basis*. So, to compare the percent cost of a commercial paper issue to the percent cost of a bank loan, we first convert the commercial paper **discount yield** to an effective annual interest rate. We use the following three-step process to find this rate.

1. Compute the discount from face value using Equation 20-2, the formula for the dollar amount of the discount on a commercial paper note:

Dollar Amount of the Discount on a Commercial Paper Note

$$D = \frac{DY \times Par \times DTG}{360} \tag{20-2}$$

where: D = Dollar amount of the discount

DY = Discount yield

Par = Face value of the commercial paper issue; the amount to be paid at maturity

DTG = Days to go until maturity

2. Compute the price of the commercial paper issue by subtracting the discount (D) from par, as shown in Equation 20-3:

Price of a Commercial Paper Note

$$Price = Par - D \tag{20-3}$$

3. Compute the effective annual interest rate using the following formula, Equation 20-4:

Effective Annual Interest Rate of a Commercial Paper Note

$$k = \left(\frac{Par}{Price}\right)^{\frac{365}{DTG}} - 1 \tag{20-4}$$

where: k = the effective annual interest rate

To illustrate the three-step process, imagine you are a financial analyst at GMAC, Inc., and your commercial paper dealer[4] has informed you that she is willing to pay 3.3 percent discount yield for a $1 million issue of GMAC 90-day commercial paper notes. What effective annual interest rate does the 3.3 percent discount yield equate to?

[4]Some firms sell commercial paper through dealers. Others, such as General Motors Acceptance Corporation (GMAC), sell it directly to the public.

Step 1: Compute the discount using Equation 20-2.

$$D = \frac{DY \times Par \times DTG}{360}$$

$$= \frac{.033 \times \$1,000,000 \times 90}{360}$$

$$= \frac{\$2,970,000}{360}$$

$$= \$8,250$$

We see that with a 3.3 percent discount rate, $1 million face value, and 90 days to go until maturity, the dollar amount of the discount on the commercial paper note is $8,250.

Step 2: Compute the price using Equation 20-3.

$$\text{Price} = \text{Par} - D$$

$$= \$1{,}000{,}000 - \$8{,}250$$

$$= \$991{,}750$$

Our calculations show that the price of the 90-day commercial paper note with a face value of $1 million at a discount price of $8,250 is $991,750.

Step 3: Compute the effective annual interest rate using Equation 20-4.

$$k = \left(\frac{Par}{Price}\right)^{\frac{365}{DTG}} - 1$$

$$= \left(\frac{\$1,000,000}{\$991,750}\right)^{\frac{365}{90}} - 1$$

$$= 1.00832^{4.056} - 1$$

$$= 1.0342 - 1$$

$$= .0342, \text{ or } 3.42\%$$

Applying Equation 20-4, we find that the effective annual interest rate of a $1 million, 90-day commercial paper note with a price of $991,750 is 3.42 percent. Now, you can compare the 3.42 percent effective annual interest rate GMAC would pay for commercial paper to the various loan rates available and choose the best deal.

In the next section, we examine the effect of loan terms on the effective interest rate.

How Loan Terms Affect the Effective Interest Rate of a Loan

The effective interest rate of a bank loan may not be the same as the stated interest rate advertised by the bank because of a lender's loan terms. In the following sections, we describe how to find the effective interest rate and what terms affect the effective interest rate.

The Effective Interest Rate

Some loans have the same effective rate of interest as the stated rate of interest because the bank places no terms on the loan other than the amount of interest and the amount borrowed. In these cases, finding the effective interest rate per period is straightforward. We divide the interest paid on the loan by the amount of money borrowed during the period of the loan (and afterwards multiply the result by 100 to obtain a percent). Equation 20-5 shows the effective interest rate formula:

Effective Interest Rate of a Loan

$$k = \frac{\$ \text{ Interest You Pay}}{\$ \text{ You Get to Use}} \tag{20-5}$$

where: k = the effective interest rate

For example, suppose you borrow $10,000 from a bank for one year, and your promissory note specifies that you are to pay $1,000 in interest at the end of the year. We use Equation 20-5 to find the effective interest rate for the loan as follows:

$$k = \frac{\$1,000}{\$10,000}$$

$$= .10, \text{ or } 10\%$$

The calculations show that for a $10,000 loan with $1,000 in interest, the effective interest rate is 10 percent.

Effective interest rates are customarily expressed as annual rates. If a loan's maturity is for one year and there are no complicating factors, computing effective interest rates is quite simple, as we have just seen. Equation 20-5 gives the effective rate per period.

For many loans, however, things are not so simple. Lenders have a variety of terms and conditions that they apply to loans, and many of them affect the effective interest rate. Two of the more common loan terms, *discount loans* and *compensating balances*, are discussed next.

Discount Loans

Sometimes a lender's terms specify that interest is to be collected up front, at the time the loan is made, rather than at maturity. When this is the case, the loan is referred to as a **discount loan**. In a discount loan, the amount the borrower actually receives is the principal amount borrowed minus the interest owed. So the amount the borrower may use is lower than if the loan were a standard loan with interest paid annually at year's end. As a result, the borrower's effective interest rate is higher than it would be for a standard loan.

Let's return to our earlier one-year, $10,000 loan example to see what happens if it is a discount loan. Instead of paying $1,000 in interest at the end of the year (the equivalent of an effective interest rate of 10 percent), the $1,000 in interest must be paid at the beginning of the year. According to Equation 20-5, the effective interest rate is as follows:

$$k = \frac{\$ \text{ Interest You Pay}}{\$ \text{ You Get to Use}}$$

$$= \frac{\$1,000}{\$10,000 - \$1,000}$$

$$= \frac{\$1,000}{\$9,000}$$

$$= .1111, \text{ or } 11.11\%$$

Note that by collecting the $1,000 interest on the loan at the start of the year, the effective rate of interest rose from 10 percent to 11.11 percent, solely because of the timing of the interest payment. The stated interest rate, then, is lower than the borrower's effective rate of interest.

Compensating Balances

Sometimes a lender's loan terms will specify that while a loan is outstanding the borrower must keep some minimum balance in a checking account at the lender's institution. The amount required is called a **compensating balance**. The lender would say that this minimum balance is its compensation for granting the borrower favorable loan terms (even though the terms may not be especially favorable). Because the borrower cannot allow the balance in the checking account to fall below the required minimum during the life of the loan, the borrower may not use these funds during the life of the loan. As a result, the borrower's effective interest rate is higher than it would be without a compensating balance requirement. This assumes that the borrower would not have kept the required compensating balance funds in the checking account if the loan were a standard loan.

Let's add a compensating balance requirement to our one-year, $10,000 loan with a year-end interest payment of $1,000. The stated rate of interest is 10 percent. Assume the bank requires a compensating balance of 12 percent of the amount borrowed in a checking account during the life of the loan. This compensating balance requirement would be referred to as a "12 percent compensating balance requirement." We quickly figure out that 12 percent of $10,000 is $1,200. Then we use Equation 20-5 to find the following effective interest rate:

$$k = \frac{\$ \text{ Interest You Pay}}{\$ \text{ You Get to Use}}$$

$$= \frac{\$1,000}{\$10,000 - \$1,200}$$

$$= \frac{\$1,000}{\$8,800}$$

$$= .1136, \text{ or } 11.36\%$$

We find that the effect of the bank's 12 percent compensating balance requirement is to raise the effective interest rate to the borrower by 1.36 percentage points. Instead of paying 10 percent, the borrower actually pays 11.36 percent. The effect of the compensating balance requirement is to increase the effective rate of interest, 11.36 percent, compared with the stated rate of interest of 10 percent.

Figure 20-3 shows how changing the terms of a one-year loan can affect the effective interest rate. The chart summarizes the effect of simple interest, discount interest, and compensating balances. Figure 20-3 demonstrates that loan terms such as discount interest and compensating balances reduce the amount the borrower gets to use, thus raising the effective interest rate.

Loan Maturities Shorter Than One Year

Another term that affects the effective interest rate is a loan maturity that is less than one year. In such cases we modify Equation 20-5 to convert the effective interest rate of the loan that is for less than a year into an annual rate. We find the annual rate so that we can compare that rate with those from other lenders, almost all of which are expressed as annual rates. Annualizing the rates allows a comparison of apples to apples, rather than apples to oranges. An example demonstrates this point.

Suppose you are borrowing $10,000 for one *month* and paying $1,000 in interest at the end of the *month* (with no other conditions). The effective interest rate of this loan is 10 percent, according to Equation 20-5. However, remember that the rate is 10 percent *per month*. It would be inaccurate to say that the interest rate on this loan was the same as a 10 percent loan from another financial institution. Why? Because the 10 percent stated rate from the other institution is an annual rate and you are comparing it to a monthly rate. For one month, the other institution's stated rate would be 10 percent divided by 12 months equals .83 percent, which is considerably less than the 10 percent monthly interest on your loan.

Annualizing Interest Rates We can modify Equation 20-5 so that it annualizes interest rates that are not paid yearly. The modified formula, Equation 20-6, follows:

Effective Annual Interest Rate When the Loan Term Is Less Than One Year

$$k = \left(1 + \frac{\text{\$ Interest You Pay}}{\text{\$ You Get to Use}}\right)^{\frac{\text{Loan Periods}}{\text{in a Year}}} - 1 \qquad (20\text{-}6)$$

where: k = the effective annual interest rate

Figure 20-3 How Changing the Terms of a Loan Can Affect the Effective Loan Maturities Shorter Than One Year Interest Rate

Simple Interest	$\frac{\text{\$ Interest You Pay}}{\text{\$ You Get to Use}}$	$\frac{\$1{,}000}{\$10{,}000}$	= .10, or 10%
Discount Interest	$\frac{\text{\$ Interest You Pay}}{\text{\$ You Get to Use}}$	$\frac{\$1{,}000}{\$10{,}000 - \$1{,}000 = \$9{,}000}$	= .1111, or 11.11%
Compensating Balance (12%)	$\frac{\text{\$ Interest You Pay}}{\text{\$ You Get to Use}}$	$\frac{\$1{,}000}{\$10{,}000 - \$1{,}200 = \$8{,}800}$	= .1136, or 11.36%

We multiply the results of Equation 20-6 by 100 to find the percentage rate.

Now let's use Equation 20-6 to annualize the $10,000 loan with interest of $1,000 a month. Remember, the monthly interest rate for this loan is 10 percent, and there are 12 monthly loan periods in a year. The calculations follow:

$$k = \left(1 + \frac{\$1,000}{\$10,000}\right)^{(12)} - 1$$

$$= (1 + .10)^{(12)} - 1$$

$$= (1.10)^{(12)} - 1$$

$$= 3.1384 - 1$$

$$= 2.1384$$

$$\times 100 = 213.84\%$$

We find that the interest rate is more than 213 percent. Surely there is a cheaper alternative at another bank. Suppose you find one with a *stated* annual interest rate of 12 percent for a $10,000 one-month loan. What's the *effective* annual interest rate for this loan? In order to apply Equation 20-6 to find out, we first compute the dollar amount of interest to be paid:

- The stated rate for one year, or 12 months, is 12 percent, so the rate for one month is 12 percent/12 = 1 percent.[5]
- 1 percent of $10,000 is $10,000 × .01 = $100.
- So, the amount of "dollars you pay" to get this loan is $100.

Because the loan is for one month, we know that there are 12 loan periods in a year. Now we're ready to plug these numbers into Equation 20-6 as shown next:

$$k = \left(1 + \frac{\text{\$ Interest You Pay}}{\text{\$ You Get to Use}}\right)^{\text{Loan Periods in a Year}} - 1$$

$$= \left(1 + \frac{\$100}{\$10,000}\right)^{(12)} - 1$$

$$= (1 + .01)^{(12)} - 1$$

$$= (1.01)^{(12)} - 1$$

$$= 1.1268 - 1$$

$$= .1268$$

$$\times 100 = 12.68\%$$

[5]If the loan's term is one week, divide by 52. If it is one day, divide by 365, and so on.

The effective annual rate, 12.68 percent, is a little higher than the bank's stated rate of 12 percent because of the compounding effect of adding "interest on interest" for 12 months.

In the chapter opener, we described the payday loan terms of Loan Mart. If $100 were borrowed for the normal two-week period, a check for $120 dated two weeks hence would have to be turned over to Loan Mart by the borrower. This reflects the repayment of the $100 principal plus the $20 "fee" charged. Treating the fee as interest we get:

$$k = \left(1 + \frac{\$20}{\$100}\right)^{(26)} - 1$$

$$= 1.20^{26} - 1$$

$$= 114.47546 - 1$$

$$= 113.47546$$

$$¥100 = 11{,}347.546\%$$

The exponent was 26, because there are 26 two-week periods per year (52 weeks per year divided by 2). The effective annual rate for this loan is 11,347.546 percent.

We have seen how discount loans, compensating balances, and loans that have maturities less than a year affect the effective annual interest rate. Next, we walk through an example of a loan with more than one complicating term.

A Comprehensive Example

Let's consider a loan that includes all the complicating factors discussed in the preceding sections. Suppose you want to borrow $5,000 for one week, and the bank's terms are 8 percent interest, collected on a discount basis, with a 10 percent compensating balance. What is the effective annual interest rate of this loan?

Computing the Interest Cost in Dollars The bank's stated rate of interest for one year, or 52 weeks, is 8 percent, so the rate for one week is 8 percent/52 = 0.1538 percent.

.01538 percent of $5,000 is .001538 × $5,000 = $7.69

So, the amount of dollars in interest that you pay to obtain this loan is $7.69.

Computing the Net Amount Received Because this is a discount loan, the interest will be collected up front. That means $7.69 will be deducted from the $5,000 loan.

The loan also has a 10 percent compensating balance requirement, so 10 percent of the $5,000, or $500, must remain in a checking account at the bank, denying you the use of it during the life of the loan.

The net amount of money that you will get to use during the life of the loan is $5,000 – $7.69 – $500 = $4,492.31.

Computing the Effective Annual Interest Rate We use Equation 20-6, the formula for annualizing a loan with a term of interest payments less than a year, to find the effective annual interest rate for this loan. The calculations follow:

$$k = \left(1 + \frac{\text{\$ Interest You Pay}}{\text{\$ You Get to Use}}\right)^{\text{Loan Periods in a Year}} - 1$$

$$= \left(1 + \frac{\$7.69}{\$4,492.31}\right)^{(52)} - 1$$

$$= (1 + .001712)^{(52)} - 1$$

$$= (1.001712)^{(52)} - 1$$

$$= 1.093 - 1$$

$$= .093$$

$$¥ 100 = 9.3\%$$

We see that the effective annual interest rate for a one-week, $5,000 discount loan with an interest rate of 8 percent and a 10 percent compensating balance requirement is 9.3 percent. The effective rate of interest, 9.3 percent, is higher than the 8 percent stated rate of interest.

Computing the Amount to Borrow

In the preceding comprehensive example, you tried to borrow $5,000. Presumably that was the amount you needed to use for a week. But, as shown, if the bank collected $7.69 in interest up front and made you keep $500 in a checking account during the term of the loan, you would only receive $4,492.31. Clearly, given the bank's terms, you will have to borrow some amount greater than $5,000 to end up with the $5,000 you need. So the question is, how much do you have to borrow to walk out of the bank with $5,000?

We solve this question algebraically. Let X = the amount to borrow. Now, because the loan is a discount loan, the bank will collect one week's worth of interest, or (.08/52) times X at the beginning of the week. Furthermore, 10 percent of X must remain in a checking account at the bank as a compensating balance. When these two amounts are subtracted from X, the remainder must equal $5,000. Here is the equation describing the situation:

$$X - \frac{.08}{52}X - .10X = \$5,000$$

We then solve for X as follows:

$$X - \frac{.08}{52}X - .10X = \$5,000$$

$$X - .001538X - .10X = \$5,000$$

$$.8985X = \$5,000$$

$$X = \$5,564.83$$

We find that if you borrow $5,564.83 for one week at 8 percent, discount interest, with a 10 percent compensating balance requirement, you will leave the bank with $5,000.[6]

We have examined how loan terms can affect the effective interest rate. Now we turn to types of collateral that are used to secure short-term loans.

Collateral for Short-Term Loans

Take Note
Loans for which collateral is required are called secured loans. If no collateral is required, the loan is unsecured.

The promissory note that specifies the terms of the loan often includes the type of **collateral** used to secure the loan.

For secured short-term loans, lenders usually require that the assets pledged for collateral be short term in nature also. Lenders require short-term assets because they are generally more liquid than long-term assets and are easier to convert to cash if the borrower defaults on the loan. The major types of short-term assets used for short-term loan collateral are accounts receivable and inventory.

Accounts Receivable as Collateral

Accounts receivable are assets with value because they represent money owed to a firm. Because of their value, a lender might be willing to accept the accounts as collateral for a loan. If so, the borrowing firm may *pledge* its accounts receivable. The pledge is a promise that the firm will turn over the accounts receivable collateral to the lender in the case of default.

Loan agreements that use accounts receivable as collateral usually specify that the firm is responsible for the amount of the accounts receivable even if the firm's credit customers fail to pay. In short, the borrowing firm still has to pay even if its customers don't.

Lenders try to safeguard against accounts receivable that fluctuate so much that the value of the account becomes less than the value of the loan. Accounts receivable fluctuate because some credit customers may send in payments on their outstanding accounts receivable, others may make new charges, and some may be late with payments. If accounts receivable are pledged as short-term loan collateral, lenders usually require a loan payment plan that prevents the value of the accounts from dropping below the value of the loans. For instance, a bank may require a borrower to send payments received on pledged accounts to the lender to apply against the loan balance. Sending payments as received decreases the balance of the loan as the value of accounts receivable decreases, thereby protecting the lender.

[6] In case you're wondering, the effective annual interest rate for this loan, per Equation 20-2, is 9.3 percent.

Inventory as Collateral

Like accounts receivable, inventory represents assets that have value, so it can be used as collateral for loans. The practice of using inventory as collateral for a short-term loan is called .

A major problem with inventory financing is valuing the inventory. If a borrowing firm defaults on a loan secured by inventory, the lender wants to know that the inventory can compensate for the remaining loan balance. To illustrate how important valuing inventory is, suppose you were a banker who lent a firm $200,000 for six months. As collateral, the firm put up its entire inventory of Alien Angels dolls, based on characters in a soon-to-be-released major motion picture. Unfortunately, the movie was a bust. The firm was unable to repay its loan, and you as the banker have ended up with 10,000 dolls no one wants. It is small comfort to you now that the firm said the angels were worth $20 each when they were offered as collateral.

To compensate for the difficulties in valuing inventory, lenders usually lend only a fraction of the stated value of the inventory. If the inventory consists of fairly standard items that can be resold easily, like 2 × 4s, then the lender might be willing to lend up to 80 percent of the inventory's stated value. In contrast, if the inventory consists of perishable or specialized items, like the Alien Angels in our example, then the lender will only lend a small fraction of their value, or might not be willing to accept them as collateral at all.

Inventory depletion is an additional concern for lenders who allow borrowers to use inventory as short-term loan collateral. The borrowing firm can sell the pledged inventory and use the cash received for other purposes, leaving the lender with nothing if the borrower defaults. This can happen when the lender has only a general claim, or *blanket lien*, on the borrower's inventory in the event of a default. Therefore, when inventory is used as collateral for a loan, the lender will often insist on some procedures to safeguard its interests.

One procedure to safeguard the interests of the lender is for the borrower to issue trust receipts to the lender. A *trust receipt* is a legal document in which specifically identified assets, inventory in this case, are pledged as collateral for the loan. Automobiles, railroad cars, and airplanes are often financed this way. The lender can make surprise visits to the borrower's business, checking to be sure that the pledged assets are on hand as they should be. There is often a unique identification number (a car's VIN, vehicle identification number, for example) on these assets.

Another procedure to control pledged inventory is to use a public warehouse where the inventory cannot be removed and sold without permission of the lender. When the inventory is sold (with the lender's permission), the proceeds are sent to the lender and used to reduce the outstanding loan balance. Although this arrangement gives the lender control, it is expensive for the borrowing firm. Usually the borrowing firm must pay for the warehouse and seek the lender's permission each time it wants to sell some inventory.

We have seen that short-term secured loans generally have short-term liquid assets pledged as collateral, such as accounts receivable or inventory. Lenders often add loan terms to protect against problems such as fluctuating accounts receivable and overvalued or depleted inventory.

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What's Next

We discussed short-term financing in this chapter, the final chapter of Part 5 of the text. We turn next to Part 6, Finance in the Global Economy. In Chapter 21, we discuss international finance.

Summary

1. Explain the need for short-term financing.

Firms rely on short-term financing from outside sources for two reasons:

- *Growth*: Profits simply may not be high enough to keep up with the rate at which they are buying new assets.
- *Choice*: Rather than save enough money to make desired purchases, many firms borrow money at the outset to make their purchases.

2. List the advantages and disadvantages of short-term financing.

Short-term financing is usually a cheaper option than long-term financing because of its generally lower interest rates. However, short-term financing is riskier than long-term financing because, unlike long-term financing, the loans come due soon, the lender may not be willing to renew financing on favorable terms, and short-term interest rates may rise unexpectedly.

3. Describe three types of short-term financing.

- *Loans from banks and other institutions*: When a bank or other institution agrees to lend money to a firm, the firm signs a promissory note that specifies the repayment terms. Two common types of short-term business loans are self-liquidating loans and a line of credit. A self-liquidating loan is a loan for an asset that will generate enough return to repay the loan balance. A line of credit is a maximum total balance that a bank sets for a firm's outstanding short-term loans.
- *Trade credit*: Trade credit is obtained by purchasing materials, supplies, or services on credit. By buying on credit, the firm has use of the funds during the time of the purchase until the account is paid.
- *Commercial paper*: Commercial paper consists of unsecured notes issued by large, creditworthy corporations for periods up to 270 days.

4. Compute the cost of trade credit and commercial paper.

The cost of trade credit is calculated by dividing the amount of the discount offered by the supplier by the amount the buyer owes. The result is annualized for comparison with other financing sources.

The cost of commercial paper is quoted as a discount yield. To compare the percent cost of a commercial paper issue to the percent cost of a bank loan, the commercial paper's discount yield must be converted to an effective annual interest rate.

5. Calculate the cost of a loan and explain how loan terms affect the effective interest rate.

The cost of a loan is normally measured by dividing the amount paid to obtain the loan by the amount the borrower gets to use during the life of the loan. The result is converted to a percentage. The stated interest rate on a loan is not always the same as the loan's effective annual interest rate. If the lender collects interest up front (a discount interest loan) or requires the borrowing firm to keep a fraction of the loan in an account at the lending institution (a compensating balance), then the amount of money the borrower gets to use is reduced. As a result, the effective rate of interest the borrower is paying is increased.

6. Describe how accounts receivable and inventory can be used as collateral for short-term loans.

Short-term loans are often secured by short-term, liquid assets, such as accounts receivable and inventory. When accounts receivable are used for collateral, the borrower pledges to turn over its accounts receivable to the lender if the borrower defaults. When inventory is used for collateral, the borrowing firm often sets aside the inventory that has been identified for collateral in a separate warehouse. When the inventory is sold, the cash received is forwarded to the lender in payment for the loan.

Equations Introduced in This Chapter

Equation 20-1. Trade Credit Effective Annual Interest Rate Formula:

$$k = \left[1 + \frac{\text{Discount \%}}{100 - \text{Discount \%}}\right]^{\frac{365}{\text{Days to Pay} - \text{Discount Period}}} - 1$$

where: k = Cost of trade credit expressed as an effective annual interest rate

Discount % = Percentage discount being offered

Days to Pay = Time between the day of the credit purchase and the day the firm must pay its bill

Discount Period = Number of days in the discount period

Equation 20-2. Dollar Amount of the Discount on a Commercial Paper Note:

$$D = \frac{DY \times Par \times DTG}{360}$$

where: D = Dollar amount of the discount

DY = Discount yield

Par = Face value of the commercial paper issue; the amount to be paid at maturity

DTG = Days to go until maturity

Equation 20-3. Price of a Commercial Paper Note:

$$\text{Price} = \text{Par} - D$$

where: Par = Face value of the note at maturity

D = Dollar amount of the discount

Equation 20-4. Effective Annual Interest Rate of a Commercial Paper Note:

$$k = \left(\frac{\text{Par}}{\text{Price}}\right)^{\left(\frac{365}{DTG}\right)} - 1$$

where: k = The effective annual interest rate

Par = Face value of the note at maturity

Price = Price of the note when purchased

DTG = Number of days until the note matures

Equation 20-5. Effective Interest Rate of a Loan:

$$k = \frac{\text{\$ Interest You Pay}}{\text{\$ You Get to Use}}$$

where: k = The effective interest rate

Equation 20-6. Effective Annual Interest Rate:

$$k = \left(1 + \frac{\text{\$ Interest You Pay}}{\text{\$ You Get to Use}}\right)^{\left(\frac{\text{Loan Periods}}{\text{in a Year}}\right)} - 1$$

where: k = The effective annual interest rate

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Self-Test

ST-1. Your company's suppliers offer terms of 3/15, n40. What is the cost of forgoing the discount and delaying payment until the fortieth day?

ST-2. A commercial paper dealer is willing to pay 4 percent discount yield for a $1 million issue of Pennzoil 60-day commercial paper notes. To what effective annual interest rate does the 4 percent discount yield equate?

ST-3. A bank is willing to lend your company $20,000 for six months at 8 percent interest, with a 10 percent compensating balance. What is the effective annual interest rate of this loan?

ST-4. Using the loan terms from ST-3, how much would your firm have to borrow in order to have $20,000 for use during the loan period?

Review Questions

1. Companies with rapidly growing levels of sales do not need to worry about raising funds from outside the firm. Do you agree or disagree with this statement? Explain.

2. Banks like to make short-term, self-liquidating loans to businesses. Why?

3. What are compensating balances and why do banks require them from some customers? Under what circumstances would banks be most likely to impose compensating balances?

4. What happens when a bank charges discount interest on a loan?

5. What is trustworthy collateral from the lender's perspective? Explain whether accounts receivable and inventory are trustworthy collateral.

6. Trade credit is free credit. Do you agree or disagree with this statement? Explain.

7. What are the pros and cons of commercial paper relative to bank loans for a company seeking short-term financing?

Build Your Communication Skills

CS-1. Your firm's request for a $50,000 loan for one month has been approved. The bank's terms are 10 percent annual discount interest with a 10 percent compensating balance. Prepare a one-page report for the CEO of your firm explaining how the effective interest rate of this loan is calculated.

CS-2. Imagine you are a loan officer for a bank. One of the town's businesses has applied for a loan of $200,000 for six months. The company has offered to put up the building in which its manufacturing operations are located as collateral for the loan. Local real estate agents estimate the building is worth at least $220,000. Write a letter to the company explaining why your bank does not wish to accept the building as collateral. Propose two alternative assets that your bank would accept.

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Problems

Simple and Discount Loans

20-1. Harold Hill is planning to borrow $20,000 for one year, paying interest in the amount of $1,600 to a bank. Calculate the effective annual interest rate if the interest is paid:

a. At the end of the year

b. At the beginning of the year (discount loan)

Loans with Compensating Balance

20-2. Chad Gates is planning to borrow $40,000 for one year, paying interest of $2,400 to a bank at the beginning of the year (discount loan). In addition, according to the terms of the loan, the bank requires Chad to keep 10 percent of the borrowed funds in a non-interest-bearing checking account at the bank during the life of the loan. Calculate the effective annual interest rate.

Challenge Problem

20-3. Ralph Bellamy is considering borrowing $20,000 for a year from a bank that has offered the following alternatives:

a. An interest payment of $1,800 at the end of the year

b. An interest payment of 8 percent of $20,000 at the beginning of the year

c. An interest payment of 7.5 percent of $20,000 at the end of the year in addition to a compensating balance requirement of 10 percent

(i) Which alternative is best for Ralph from the effective-interest-rate point of view?

(ii) If Ralph needs the entire amount of $20,000 at the beginning of the year and chooses the terms under (c), how much should he borrow? How much interest would he have to pay at the end of the year?

Loans with a Life of Less Than a Year

20-4. If Joyce Heath borrows $14,000 for three months at an annual interest rate of 16 percent paid up-front with a compensating balance of 10 percent, compute the effective annual interest rate of the loan.

Discount Loans with Compensating Balance for Less Than a Year

20-5. You are planning to borrow $10,000 from a bank for two weeks. The bank's terms are 7 percent annual interest, collected on a discount basis, with a 10 percent compensating balance. Compute the effective annual interest rate of the loan.

Commercial Paper

20-6. Bud Baxter is planning a $1 million issue of commercial paper to finance increased sales from easing the credit policy. The commercial paper note has a 60-day maturity and 6 percent discount yield. Calculate:

a. The dollar amount of the discount

b. The price

c. The effective annual interest rate for the issue

20-7. Carmen Velasco, an analyst at Smidgen Corporation, is trying to calculate the effective annual interest rate for a $2 million issue of a Smidgen 60-day commercial paper note. The commercial paper dealer is prepared to offer a 4 percent discount yield on the issue. Calculate the effective annual interest rate for Carmen.

Commercial Paper

20-8. Bathseba Everdene, the sales manager of Gordon's Bakery, Inc., wants to extend trade credit with terms of 2/15, n45 to your company to boost sales. Calculate the cost of forgoing the discount and paying on the forty-fifth day.

Trade Credit

20-9. Calculate the cost of forgoing the following trade credit discounts and paying on the last day allowed:

a. 3/10, n60

b. 2/15, n30

Recalculate the costs assuming payments were made on the fortieth day in each of the preceding cases without any penalty. Compare your results.

Trade Credit

20-10. Legacy Enterprises received an invoice from its supplier. The terms of credit were stated as 3/15, n45. Calculate the effective annual interest rate on the trade credit.

Trade Credit

20-11. Callaway Krugs issues $2,000,000 in commercial paper for 90 days at a 3.8 percent discount yield. Calculate each of the following.

a. Dollar amount of the discount

b. Price of the commercial paper

c. Effective annual interest rate on the commercial paper

Commercial Paper

20-12. Mr. Daniels wants to buy a new car. The bank has offered him a $20,000 discount interest loan at 6.5 percent. What is the effective interest rate?

Effective Interest Rate

20-13. National Bank requires that all its borrowers have a compensating balance of 13 percent of the amount borrowed. If you need to take out a small-business expansion loan for $30,000 at 10 percent, what would be your effective interest rate on this one-year loan?

Compensating Balance

20-14. You are the financial manager for Talc, Ltd., and the owner has just asked you to compute the effective annual interest rate on the loans the company currently has outstanding. The following is a list of these loans:

a. $50,000; .5% monthly rate, maturity: 1 month

b. $150,000, .6% monthly rate, maturity: 3 months

c. $75,000, .75% monthly rate, maturity: 1 month

d. $120,000; .8% monthly rate, maturity: 6 months

Annualizing Interest Rates

Comparing Costs of Alternative Short-Term Financing Sources

20-15. To sustain its growth in sales, Monarch Machine Tools Company needs $100,000 in additional funds next year. The following alternatives for financing the growth are available:

a. Forgoing a discount available on trade credit with terms of 1/10, n45 and, hence, increasing its accounts payable

b. Obtaining a loan from a bank at 10 percent interest paid up front

Calculate the cost of financing for each option and select the best source.

Comparing Costs of Alternative Short-Term Financing Sources

20-16. If the bank imposes an additional requirement of a 12 percent compensating balance on Monarch in problem 20-15 and the company could negotiate more-liberal credit terms of 1/15, n60 from its supplier, would there be any change in Monarch's choice of short-term financing?

Amount to Borrow

20-17. Ms. Johnson has just finished her company's pro forma financial statements and has concluded that $1.5 million in additional funds are needed. To cover this cash shortage, her company is going to take out a loan. HomeLand Bank has offered them a 9 percent discount interest loan with a 12 percent compensating balance. How much does Ms. Johnson's company need to borrow with these stated terms to leave the bank with $1.5 million in usable funds?

Answers to Self-Test

ST-1. The cost is found using Equation 20-1. The discount percentage is 3 percent, the discount period is 15 days, and payment is to be made on the fortieth day. The calculations follow:

$$k = \left(1 + \frac{3}{100 - 3}\right)^{\frac{365}{40 - 15}} - 1$$

$$= (1 + .0309278)^{(14.6)} - 1$$

$$= (1.0309278)^{(14.6)} - 1$$

$$= 1.56 - 1$$

$$= .56, \text{ or } 56\%$$

ST-2. Use the three-step process described in the text to find the effective annual interest rate as follows:

Step 1: Compute the discount using Equation 20-2.

$$D = \frac{DY \times Par \times DTG}{360}$$

$$= \frac{.04 \times \$1,000,000 \times 60}{360}$$

$$= \frac{\$2,400,000}{360}$$

$$= \$6,667$$

Step 2: Compute the price using Equation 20-3.

Price = Par – D

= $1,000,000 – $6,667

= $993,333

Step 3: Compute the effective annual interest rate using Equation 20-4.

$$k = \left(\frac{Par}{Price}\right)^{\frac{365}{DTG}} - 1$$

$$= \left(\frac{\$1,000,000}{\$993,333}\right)^{\frac{365}{60}} - 1$$

$$= 1.00671^{6.083} - 1$$

$$= 1.0415 - 1$$

$$= .0415, \text{ or } 4.15\%$$

ST-3. The amount your firm would pay in interest with the loan is

.08 / 2 = .04 for six months

.04 × $20,000 = $800

The amount your firm would be able to use during the life of the loan is the principal less the compensating balance:

$$\$20,000 – (.10 \times \$20,000) = \$18,000$$

The loan is for six months, so we use Equation 20-6 to solve for the effective annual interest rate:

$$k = \left(1 + \frac{\$800}{\$18,000}\right)^{(2)} - 1$$

$$= (1 + .0444)^{(2)} - 1$$

$$= (1.044)^{(2)} - 1$$

$$= 1.0908 - 1$$

$$= .0908$$

$$¥ 100 = 9.08\%$$

ST-4. Let X = the amount to borrow.

$$X - .10X = \$20,000$$

$$.09X = \$20,000$$

$$X = \$22,222$$

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