CHAPTER

18

Short-Term Finance and Planning

OPENING CASE

Most often, when news breaks about a firm's cash position, it's because the company is running *low* on cash. However, that wasn't the case for many companies in early 2010. Car maker Ford, for example, had a cash balance of $42.8 billion, or $12.71 per share. What's so striking about that amount is the stock was trading for only about $12.60 per share, so Ford's cash per share was about the same as its stock price, normally not a good sign. Other companies with healthier operations also had large amounts of cash. For example, General Electric had a cash balance of about $124 billion. But no company came close to investment bank Goldman Sachs, with a cash hoard of $219 billion. In examining these numbers, it is clear that these companies certainly had ample cash reserves; in fact, the word *enormous* might be more appropriate. Why would these firms hold such large quantities of cash? To find out, this chapter explores short-term finance and examines optimal investments in current assets such as cash.

To this point, we have described many of the decisions of long-term finance, such as those of capital budgeting, dividend policy, and financial structure. In this chapter, we begin to discuss short-term finance. Short-term finance is primarily concerned with the analysis of decisions that affect current assets and current liabilities.

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Frequently, the term *net working capital* is associated with short-term financial decision making. As we have described in previous chapters, net working capital is the difference between current assets and current liabilities. Often, short-term financial management is called *working capital management*. These terms mean the same thing.

There is no universally accepted definition of short-term finance. The most important difference between short-term and long-term finance is in the timing of cash flows. Short-term financial decisions typically involve cash inflows and outflows that occur within a year or less. For example, short-term financial decisions are involved when a firm orders raw materials, pays in cash, and anticipates selling finished goods in one year for cash. In contrast, long-term financial decisions are involved when a firm purchases a special machine that will reduce operating costs over, say, the next five years.

What types of questions fall under the general heading of short-term finance? To name just a very few:

1. What is a reasonable level of cash to keep on hand (in a bank) to pay bills?
2. How much should the firm borrow in the short term?
3. How much credit should be extended to customers?

This chapter introduces the basic elements of short-term financial decisions. First, we discuss the short-term operating activities of the firm. We then identify some alternative short-term financial policies. Finally, we outline the basic elements in a short-term financial plan and describe short-term financing instruments.

18.1 TRACING CASH AND NET WORKING CAPITAL

In this section, we examine the components of cash and net working capital as they change from one year to the next. We have already discussed various aspects of this subject in Chapters 2 and 3. We briefly review some of that discussion as it relates to short-term financing decisions. Our goal is to describe the short-term operating activities of the firm and their impact on cash and working capital.

To begin, recall that *current assets* are cash and other assets that are expected to convert to cash within the year. Current assets are presented on the balance sheet in order of their accounting liquidity—the ease with which they can be converted to cash and the time it takes to convert them. Four of the most important items found in the current asset section of a balance sheet are cash and cash equivalents, marketable securities, accounts receivable, and inventories.

Analogous to their investment in current assets, firms use several kinds of short-term debt, called *current liabilities*. Current liabilities are obligations that are expected to require cash payment within one year (or within the operating period if it is longer than one year). Three major items found as current liabilities are accounts payable, expenses payable (including accrued wages and taxes), and notes payable.

Because we want to focus on changes in cash, we start off by defining cash in terms of the other elements of the balance sheet. This lets us isolate the cash account and explore the impact on cash from the firm's operating and financing decisions. The basic balance sheet identity can be written as:

$$\textbf{Net working capital} + \textbf{Fixed assets} = \textbf{Long-term debt} + \textbf{Equity} \quad [18.1]$$

Net working capital is cash plus other current assets, less current liabilities, that is:

$$\textbf{Net working capital} = (\textbf{Cash} + \textbf{Other current assets}) - \textbf{Current liabilities} \quad [18.2]$$

If we substitute this for net working capital in the basic balance sheet identity and rearrange things a bit, we see that cash is:

$$\begin{aligned}\textbf{Cash} = {} & \textbf{Long-term debt} + \textbf{Equity} + \textbf{Current liabilities} \\ & - \textbf{Current assets other than cash} - \textbf{Fixed assets}\end{aligned} \quad [18.3]$$

This tells us in general terms that some activities naturally increase cash and some activities decrease it. We can list these various activities, along with an example of each, as follows:

ACTIVITIES THAT INCREASE CASH

Increasing long-term debt (borrowing over the long term)

Increasing equity (selling some stock)

Increasing current liabilities (getting a 90-day loan)

Decreasing current assets other than cash (selling some inventory for cash)

Decreasing fixed assets (selling some property)

ACTIVITIES THAT DECREASE CASH

Decreasing long-term debt (paying off a long-term debt)

Decreasing equity (repurchasing some stock)

Decreasing current liabilities (paying off a 90-day loan)

Increasing current assets other than cash (buying some inventory for cash)

Increasing fixed assets (buying some property)

Notice that our two lists are exact opposites. For example, floating a long-term bond issue increases cash (at least until the money is spent). Paying off a long-term bond issue decreases cash.

Activities that increase cash are called *sources of cash*. Those activities that decrease cash are called *uses of cash*. Looking back at our list, we see that sources of cash always involve increasing a liability (or equity) account or decreasing an asset account. This makes sense because increasing a liability means that we have raised money by borrowing it or by selling an ownership interest in the firm. A decrease in an asset means that we have sold or otherwise liquidated an asset. In either case, there is a cash inflow.

Uses of cash are just the reverse. A use of cash involves decreasing a liability by paying it off, perhaps, or increasing assets by purchasing something. Both of these activities require that the firm spend some cash.

EXAMPLE 18.1

Sources and Uses

Here is a quick check of your understanding of sources and uses: If accounts payable go up by $100, does this indicate a source or a use? What if accounts receivable go up by $100?

Accounts payable are what we owe our suppliers. This is a short-term debt. If it rises by $100, we have effectively borrowed the money, which is a *source* of cash. Receivables are what our customers owe to us, so an increase of $100 in accounts receivable means that we have loaned the money; this is a *use* of cash.

18.2 THE OPERATING CYCLE AND THE CASH CYCLE

The primary concern in short-term finance is the firm's short-run operating and financing activities. For a typical manufacturing firm, these short-run activities might consist of the following sequence of events and decisions:

EVENT	DECISION
1. Buying raw materials	1. How much inventory to order
2. Paying cash	2. Whether to borrow or draw down cash balances
3. Manufacturing the product	3. What choice of production technology to use
4. Selling the product	4. Whether credit should be extended to a particular customer
5. Collecting cash	5. How to collect

These activities create patterns of cash inflows and cash outflows. These cash flows are both unsynchronized and uncertain. They are unsynchronized because, for example, the payment of cash for raw materials does not happen at the same time as the receipt of cash from selling the product. They are uncertain because future sales and costs cannot be precisely predicted.

Defining the Operating and Cash Cycles

We can start with a simple case. One day, call it Day 0, we purchase $1,000 worth of inventory on credit. We pay the bill 30 days later, and, after 30 more days, someone buys the $1,000 in inventory for $1,400. Our buyer does not actually pay for another 45 days. We can summarize these events chronologically as follows:

DAY	ACTIVITY	CASH EFFECT
0	Acquire inventory	None
30	Pay for inventory	−$1,000
60	Sell inventory on credit	None
105	Collect on sale	+$1,400

THE OPERATING CYCLE There are several things to notice in our example. First, the entire cycle, from the time we acquire some inventory to the time we collect the cash, takes 105 days. This is called the **operating cycle**.

As we illustrate, the operating cycle is the length of time it takes to acquire inventory, sell it, and collect for it. This cycle has two distinct components. The first part is the time it takes to acquire and sell the inventory. This period, a 60-day span in our example, is called the **inventory period**. The second part is the time it takes to collect on the sale, 45 days in our example. This is called the **accounts receivable period**.

Based on our definitions, the operating cycle is obviously just the sum of the inventory and accounts receivable periods:

$$\begin{aligned}\text{Operating cycle} &= \text{Inventory period} + \text{Accounts receivable period} \\ 105 \text{ days} &= 60 \text{ days} + 45 \text{ days}\end{aligned} \qquad [18.4]$$

What the operating cycle describes is how a product moves through the current asset accounts. The product begins life as inventory, it is converted to a receivable when it is sold, and it is finally converted to cash when we collect from the sale. Notice that, at each step, the asset is moving closer to cash.

THE CASH CYCLE The second thing to notice is that the cash flows and other events that occur are not synchronized. For example, we don't actually pay for the inventory until 30 days after we acquire it. The intervening 30-day period is called the **accounts payable period**. Next, we spend cash on Day 30, but we don't collect until Day 105. Somehow, we have to arrange to finance the $1,000 for 105 − 30 = 75 days. This period is called the **cash cycle**.

The cash cycle, therefore, is the number of days that pass before we collect the cash from a sale, measured from when we actually pay for the inventory. Notice that, based on our definitions, the cash cycle is the difference between the operating cycle and the accounts payable period:

$$\begin{aligned}\text{Cash cycle} &= \text{Operating cycle} - \text{Accounts payable period} \\ 75 \text{ days} &= 105 \text{ days} - 30 \text{ days}\end{aligned} \qquad [18.5]$$

Figure 18.1 depicts the short-term operating activities and cash flows for a typical manufacturing firm by way of a cash flow time line. As shown, the **cash flow time line** presents the operating cycle and the cash cycle in graphical form. In Figure 18.1, the need for short-term

THE REAL WORLD

A LOOK AT OPERATING AND CASH CYCLES

In 2009, *CFO* magazine published its survey of working capital for various industries. The results of this survey highlight the marked differences in cash and operating cycles across industries. The table below shows four different industries and the median operating and cash cycles for each. Of these, the restaurant industry has the lowest operating and cash cycles. Looking at the components, it is surprising that the receivables period is as long as 8 days for the restaurant industry (most customers either pay in cash or else use debit/credit cards). For example, the receivables period for McDonald's is one of the longest in the industry at 14 days. Restaurants also have a short inventory period (we are happy to see this since we don't like spoiled food).

	RECEIVABLES PERIOD (days)	INVENTORY PERIOD (days)	OPERATING CYCLE (days)	PAYABLES PERIOD (days)	CASH CYCLE (days)
Electric utilities	41	24	65	35	30
Health care equipment	59	50	109	19	90
Paper products	28	43	71	22	49
Restaurants	8	5	13	13	0

Compared to the restaurant business, the health care equipment industry has a much longer operating cycle. Its long receivables period is the major cause. However, this does not necessarily mean the health care equipment industry is less efficient. Most, if not all, of the receivables in this industry are paid by medical insurance companies and government medical insurance such as Medicare, and these entities have relatively long payables periods.

We've seen that operating and cash cycles can vary quite a bit across industries, but these cycles also can be different for companies within the same industry. Below you will find the operating and cash cycles for selected companies within the food industry. As you can see, there are major differences. Kellogg and Chiquita have the best operating and cash cycles in the industry while McCormick and Hershey have inventory periods two to three times as long as their peers.

	RECEIVABLES PERIOD (days)	INVENTORY PERIOD (days)	OPERATING CYCLE (days)	PAYABLES PERIOD (days)	CASH CYCLE (days)
Kellogg Co.	25	26	50	32	18
Chiquita Brands	30	22	52	30	22
Hershey Co.	32	42	75	18	57
McCormick	48	50	98	31	68

By examining all parts of the cash cycle, you can see where a company is performing well or poorly, as the case may be. As we have noted, both McCormick and Hershey have longer inventory periods. But, when we dig deeper, the reason becomes apparent. McCormick is the market leader in dried seasonings and flavorings, while Hershey is of course known for its famous candy bars. So, both companies sell food products with a relatively long shelf life. In contrast, Chiquita Brands, best known for bananas, sells food with a much shorter shelf life.

Thus, while these companies are all in the food industry, their products are actually quite different and their cash cycles probably should be different as a result. The lesson here is that when you look at the operating and cash cycles, consider that each is really a financial ratio. As with any financial ratio, firm and industry characteristics will have an effect, so take care in the interpretation and also take care to choose genuine peer firms for any comparative analyses.

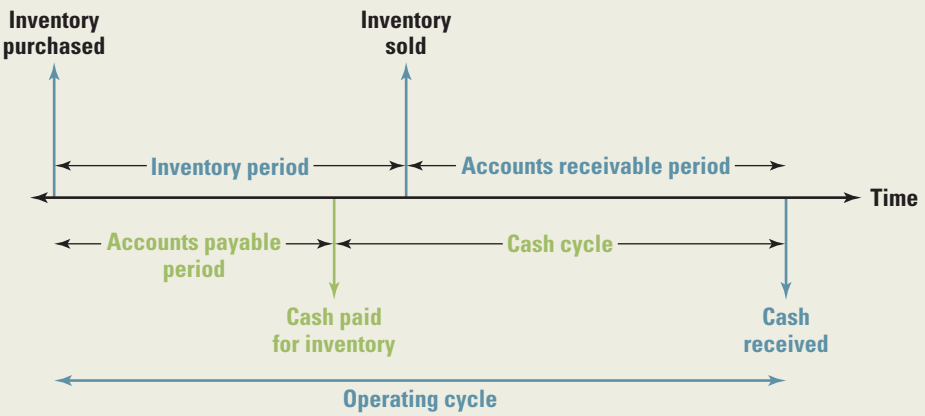

FIGURE 18.1
Cash Flow Time Line and the Short-Term Operating Activities of a Typical Manufacturing Firm

The operating cycle is the time period from inventory purchase until the receipt of cash. (The operating cycle may not include the time from placement of the order until arrival of the stock.) The cash cycle is the time period from when cash is paid out to when cash is received.

financial management is suggested by the gap between the cash inflows and the cash outflows. This is related to the lengths of the operating cycle and the accounts payable period.

The gap between short-term inflows and outflows can be filled either by borrowing or by holding a liquidity reserve in the form of cash or marketable securities. Alternatively, the gap can be shortened by changing the inventory, receivable, and payable periods. These are all managerial options that we discuss in the following sections.

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Internet-based bookseller and retailer Amazon.com provides an interesting example of the importance of managing the cash cycle. In April 2010, the market value of Amazon.com was higher than (in fact more than 52 times as much as) that of Barnes & Noble, king of the brick-and-mortar bookstores, even though Barnes & Noble's sales were greater than Amazon's.

How could Amazon.com be worth so much more? There are multiple reasons, but short-term management is one factor. During 2009, Amazon turned over its inventory about 10.6 times per year, 4 times faster than Barnes & Noble, so its inventory period is dramatically shorter. Even more striking, Amazon charges a customer's credit card when it ships a book, and it usually gets paid by the credit card firm within a day. This means Amazon has a *negative* cash cycle! In fact, during 2009, Amazon's cash cycle was negative 64 days. Every sale therefore generates a cash inflow that can be put to work immediately. Our nearby *The Real World* box discusses the cash cycle and operating cycle for several industries, as well as for some specific companies.

The Operating Cycle and the Firm's Organization Chart

Before we examine the operating and cash cycles in greater detail, it is useful for us to take a look at the people involved in managing a firm's current assets and liabilities. As Table 18.1 illustrates, short-term financial management in a large corporation involves a number of different financial and nonfinancial managers. Examining Table 18.1, we see that selling on credit involves at least three different entities: the credit manager, the marketing manager, and the controller. Of these three, only two are responsible to the vice president of finance (the marketing function is usually associated with the vice president of marketing). Thus, there is the potential for conflict, particularly if different managers concentrate on only part of the picture. For example, if marketing is trying to land a new account, it may seek more liberal credit terms as an inducement. However, this may increase the firm's investment in receivables or its exposure to bad-debt risk, and conflict can result.

TABLE 18.1
Managers Who Deal with Short-Term Financial Problems

TITLE OF MANAGER	DUTIES RELATED TO SHORT-TERM FINANCIAL MANAGEMENT	ASSETS/LIABILITIES INFLUENCED
Cash manager	Collection, concentration, disbursement; short-term investments; short-term borrowing; banking relations	Cash, marketable securities, short-term loans
Credit manager	Monitoring and control of accounts receivable; credit policy decisions	Accounts receivable
Marketing manager	Credit policy decisions	Accounts receivable
Purchasing manager	Decisions on purchases, suppliers; may negotiate payment terms	Inventory, accounts payable
Production manager	Setting of production schedules and materials requirements	Inventory, accounts payable
Payables manager	Decisions on payment policies and on whether to take discounts	Accounts payable
Controller	Accounting information on cash flows; reconciliation of accounts payable; application of payments to accounts receivable	Accounts receivable, accounts payable

Calculating the Operating and Cash Cycles

In our example, the lengths of time that made up the different periods were obvious. If all we have is financial statement information, we will have to do a little more work. We illustrate these calculations next.

To begin, we need to determine various things such as how long it takes, on average, to sell inventory and how long it takes, on average, to collect. We start by gathering some balance sheet information such as the following (in thousands):

ITEM	BEGINNING	ENDING	AVERAGE
Inventory	$2,000	$3,000	$2,500
Accounts receivable	1,600	2,000	1,800
Accounts payable	750	1,000	875

Also, from the most recent income statement, we might have the following figures (in thousands):

Net sales	$11,500
Cost of goods sold	8,200

We now need to calculate some financial ratios. We discussed these in some detail in Chapter 3; here, we just define them and use them as needed.

THE OPERATING CYCLE First of all, we need the inventory period. We spent $8.2 million on inventory (our cost of goods sold). Our average inventory was $2.5 million. We thus turned our inventory over $8.2/2.5 times during the year:[1]

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

$$= \frac{\$8.2 \text{ million}}{2.5 \text{ million}} = 3.28 \text{ times}$$

[1]Notice that in calculating inventory turnover here, we use the *average* inventory instead of using the ending inventory as we did in Chapter 3. Both approaches are used in the real world. To gain some practice using average figures, we will stick with this approach in calculating various ratios throughout this chapter.

Loosely speaking, this tells us that we bought and sold off our inventory 3.28 times during the year. This means that, on average, we held our inventory for:

$$\text{Inventory period} = \frac{\text{365 days}}{\text{Inventory turnover}}$$
$$= \frac{365}{3.28} = 111.3 \text{ days}$$

So, the inventory period is about 111 days. On average, in other words, inventory sat for about 111 days before it was sold.[2]

Similarly, receivables averaged $1.8 million, and sales were $11.5 million. Assuming that all sales were credit sales, the receivables turnover is:[3]

$$\text{Receivables turnover} = \frac{\text{Credit sales}}{\text{Average accounts receivable}}$$
$$= \frac{\$11.5 \text{ million}}{1.8 \text{ million}} = 6.4 \text{ times}$$

If we turn over our receivables 6.4 times, then the receivables period is:

$$\text{Receivables period} = \frac{\text{365 days}}{\text{Receivables turnover}}$$
$$= \frac{365}{6.4} = 57 \text{ days}$$

The receivables period is also called the *days' sales in receivables* or the *average collection period*. Whatever it is called, it tells us that our customers took an average of 57 days to pay.

The operating cycle is the sum of the inventory and receivables periods:

$$\text{Operating cycle} = \text{Inventory period} + \text{Accounts receivable period}$$
$$= 111 \text{ days} + 57 \text{ days} = 168 \text{ days}$$

This tells us that, on average, 168 days elapse between the time we acquire inventory and, having sold it, collect for the sale.

THE CASH CYCLE We now need the payables period. From the information given earlier, we know that average payables were $875,000 and cost of goods sold was $8.2 million. Our payables turnover is:

$$\text{Payables turnover} = \frac{\text{Cost of goods sold}}{\text{Average payables}}$$
$$= \frac{\$8.2 \text{ million}}{.875 \text{ million}} = 9.4 \text{ times}$$

The payables period is:

$$\text{Payables period} = \frac{\text{365 days}}{\text{Payables turnover}}$$
$$= \frac{365}{9.4} = 39 \text{ days}$$

Thus, we took an average of 39 days to pay our bills.

Finally, the cash cycle is the difference between the operating cycle and the payables period:

$$\text{Cash cycle} = \text{Operating cycle} - \text{Accounts payable period}$$
$$= 168 \text{ days} - 39 \text{ days} = 129 \text{ days}$$

[2]This measure is conceptually identical to the days' sales in inventory figure we discussed in Chapter 3.

[3]If less than 100 percent of our sales were credit sales, then we would just need a little more information, namely, credit sales for the year. See Chapter 3 for more discussion of this measure.

So, on average, there is a 129-day delay between the time we pay for merchandise and the time we collect on the sale.

EXAMPLE 18.2

The Operating and Cash Cycles

You have collected the following information for the Slowpay Company.

ITEM	BEGINNING	ENDING
Inventory	$5,000	$7,000
Accounts receivable	1,600	2,400
Accounts payable	2,700	4,800

Credit sales for the year just ended were $50,000, and cost of goods sold was $30,000. How long does it take Slowpay to collect on its receivables? How long does merchandise stay around before it is sold? How long does Slowpay take to pay its bills?

We can first calculate the three turnover ratios:

Inventory turnover = $30,000/6,000 = 5 times
Receivables turnover = $50,000/2,000 = 25 times
Payables turnover = $30,000/3,750 = 8 times

We use these to get the various periods:

Inventory period = 365/5 = 73 days
Receivables period = 365/25 = 14.6 days
Payables period = 365/8 = 45.6 days

All told, Slowpay collects on a sale in 14.6 days, inventory sits around for 73 days, and bills get paid after about 46 days. The operating cycle here is the sum of the inventory and receivables periods: 73 + 14.6 = 87.6 days. The cash cycle is the difference between the operating cycle and the payables period: 87.6 − 45.6 = 42 days.

Interpreting the Cash Cycle

Our examples show that the cash cycle depends on the inventory, receivables, and payables periods. The cash cycle increases as the inventory and receivables periods get longer. It decreases if the company is able to defer payment of payables and thereby lengthen the payables period.

Unlike Amazon.com, most firms have a positive cash cycle, and they thus require financing for inventories and receivables. The longer the cash cycle, the more financing is required. Also, changes in the firm's cash cycle are often monitored as an early-warning measure. A lengthening cycle can indicate that the firm is having trouble moving inventory or collecting on its receivables. Such problems can be masked, at least partially, by an increased payables cycle, so both cycles should be monitored.

The link between the firm's cash cycle and its profitability can be easily seen by recalling that one of the basic determinants of profitability and growth for a firm is its total asset turnover, which is defined as Sales/Total assets. In Chapter 3, we saw that the higher this ratio is, the greater is the firm's accounting return on assets, ROA, and return on equity, ROE. Thus, all other things being the same, the shorter the cash cycle is, the lower is the firm's investment in inventories and receivables. As a result, the firm's total assets are lower, and total turnover is higher.

18.3 SOME ASPECTS OF SHORT-TERM FINANCIAL POLICY

The short-term financial policy that a firm adopts will be reflected in at least two ways:

1. *The Size of the Firm's Investment in Current Assets*. This is usually measured relative to the firm's level of total operating revenues. A *flexible*, or accommodative, short-term financial policy would maintain a relatively high ratio of current assets to sales. A *restrictive* short-term financial policy would entail a low ratio of current assets to sales.[4]
2. *The Financing of Current Assets*. This is measured as the proportion of short-term debt (that is, current liabilities) and long-term debt used to finance current assets. A restrictive short-term financial policy means a high proportion of short-term debt relative to long-term financing, and a flexible policy means less short-term debt and more long-term debt.

If we take these two areas together, we see that a firm with a flexible policy would have a relatively large investment in current assets, and it would finance this investment with relatively less in short-term debt. The net effect of a flexible policy is thus a relatively high level of net working capital. Put another way, with a flexible policy, the firm maintains a higher overall level of liquidity.

The Size of the Firm's Investment in Current Assets

Short-term financial policies that are flexible with regard to current assets include such actions as:

1. Keeping large balances of cash and marketable securities.
2. Making large investments in inventory.
3. Granting liberal credit terms, which results in a high level of accounts receivable.

Restrictive short-term financial policies would be just the opposite:

1. Keeping low cash balances and making little investment in marketable securities.
2. Making small investments in inventory.
3. Allowing few or no credit sales, thereby minimizing accounts receivable.

Determining the optimal level of investment in short-term assets requires an identification of the different costs of alternative short-term financing policies. The objective is to trade off the cost of a restrictive policy against the cost of a flexible one to arrive at the best compromise.

Current asset holdings are highest with a flexible short-term financial policy and lowest with a restrictive policy. So, flexible short-term financial policies are costly in that they require a greater investment in cash and marketable securities, inventory, and accounts receivable. However, we expect that future cash inflows will be higher with a flexible policy. For example, sales are stimulated by the use of a credit policy that provides liberal financing to customers. A large amount of finished inventory on hand ("on the shelf") enables quick delivery service to customers and may increase sales. Similarly, a large inventory of raw materials may result in fewer production stoppages because of inventory shortages.

[4]Some people use the term *conservative* in place of *flexible* and the term *aggressive* in place of *restrictive*.

A more restrictive short-term financial policy probably reduces future sales to levels below those that would be achieved under flexible policies. It is also possible that higher prices can be charged to customers under flexible working capital policies. Customers may be willing to pay higher prices for the quick delivery service and more liberal credit terms implicit in flexible policies.

Managing current assets can be thought of as involving a trade-off between costs that rise and costs that fall with the level of investment. Costs that rise with increases in the level of investment in current assets are called **carrying costs**. The larger the investment a firm makes in its current assets, the higher its carrying costs will be. Costs that fall with increases in the level of investment in current assets are called **shortage costs**.

In a general sense, carrying costs are the opportunity costs associated with current assets. The rate of return on current assets is very low when compared to that on other assets. For example, the rate of return on U.S. Treasury bills is usually a good deal less than 10 percent. This is very low compared to the rate of return firms would like to achieve overall. (U.S. Treasury bills are an important component of cash and marketable securities.)

Shortage costs are incurred when the investment in current assets is low. If a firm runs out of cash, it will be forced to sell marketable securities. Of course, if a firm runs out of cash and cannot readily sell marketable securities, it may have to borrow or default on an obligation. This situation is called a *cash-out*. A firm may lose customers if it runs out of inventory (a *stockout*) or if it cannot extend credit to customers.

More generally, there are two kinds of shortage costs:

1. *Trading, or Order, Costs*. Order costs are the costs of placing an order for more cash (brokerage costs, for example) or more inventory (production setup costs, for example).
2. *Costs Related to Lack of Safety Reserves*. These are costs of lost sales, lost customer goodwill, and disruption of production schedules.

The top part of Figure 18.2 illustrates the basic trade-off between carrying costs and shortage costs. On the vertical axis, we have costs measured in dollars, and, on the horizontal axis, we have the amount of current assets. Carrying costs start out at zero when current assets are zero and then climb steadily as current assets grow. Shortage costs start out very high and then decline as we add current assets. The total cost of holding current assets is the sum of the two. Notice how the combined costs reach a minimum at CA*. This is the optimal level of current assets.

Optimal current asset holdings are highest under a flexible policy. This policy is one in which the carrying costs are perceived to be low relative to shortage costs. This is Case A in Figure 18.2. In comparison, under restrictive current asset policies, carrying costs are perceived to be high relative to shortage costs, resulting in lower current asset holdings. This is Case B in Figure 18.2.

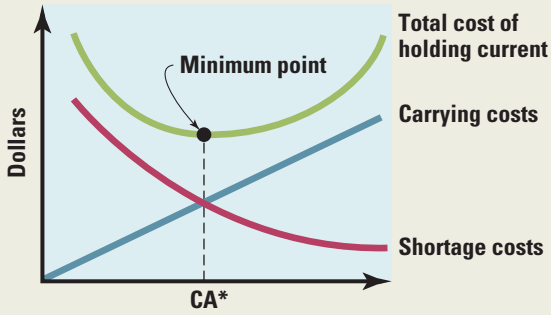
Alternative Financing Policies for Current Assets

In previous sections, we looked at the basic determinants of the level of investment in current assets, and we thus focused on the asset side of the balance sheet. Now we turn to the financing side of the question. Here we are concerned with the relative amounts of short-term and long-term debt, assuming that the investment in current assets is constant.

AN IDEAL CASE We start off with the simplest possible case: an "ideal" economy. In such an economy, short-term assets can always be financed with short-term debt, and long-term assets can be financed with long-term debt and equity. In this economy, net working capital is always zero.

FIGURE 18.2
Carrying Costs and Shortage Costs

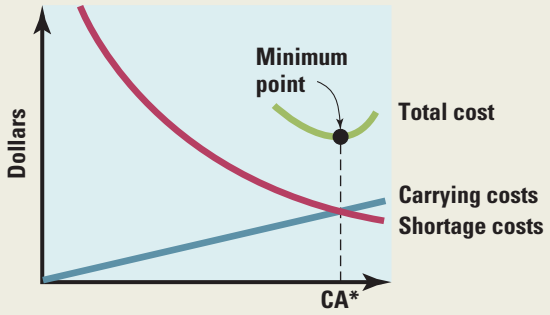
Short-Term Financial Policy: the Optimal Investment in Current Assets



CA* represents the optimal amount of current assets. Holding this amount minimizes total costs.

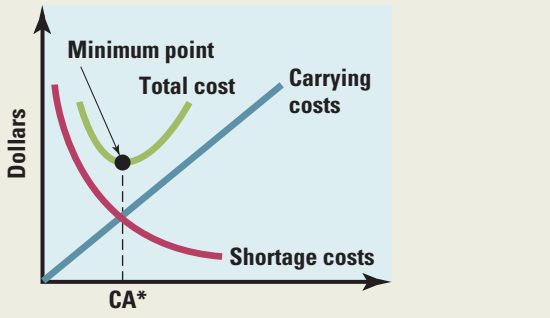
Carrying costs increase with the level of investment in current assets. They include the costs of maintaining economic value and opportunity costs. Shortage costs decrease with increases in the level of investment in current assets. They include trading costs and the costs related to being short of the current asset (for example, being short of cash). The firm's policy can be characterized as flexible or restrictive.

A. Flexible Policy



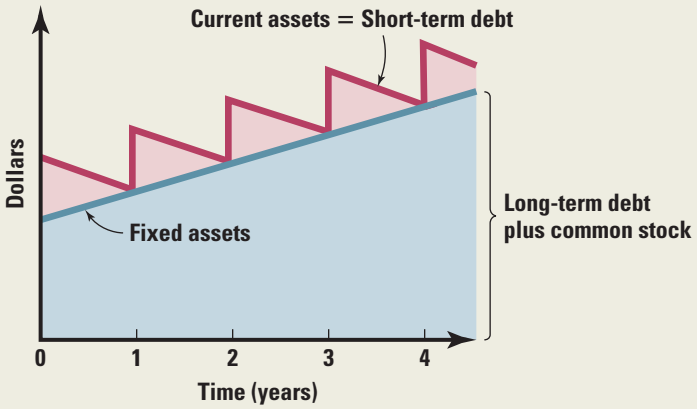
A flexible policy is most appropriate when carrying costs are low relative to shortage costs.

B. Restrictive Policy



A restrictive policy is most appropriate when carrying costs are high relative to shortage costs.

FIGURE 18.3
Financing Policy for an Ideal Economy



In an ideal world, net working capital is always zero because short-term assets are financed by short-term debt.

Consider a simplified case for a grain elevator operator. Grain elevator operators buy crops after harvest, store them, and sell them during the year. They have high inventories of grain after the harvest and end up with low inventories just before the next harvest.

Bank loans with maturities of less than one year are used to finance the purchase of grain and the storage costs. These loans are paid off from the proceeds of the sale of grain.

The situation is shown in Figure 18.3. Long-term assets are assumed to grow over time, whereas current assets increase at the end of the harvest and then decline during the year. Short-term assets end up at zero just before the next harvest. Current (short-term) assets are financed by short-term debt, and long-term assets are financed with long-term debt and equity. Net working capital—current assets minus current liabilities—is always zero. Figure 18.3 displays a "sawtooth" pattern that we will see again when we get to our discussion on cash management in the next chapter. For now, we need to discuss some alternative policies for financing current assets under less idealized conditions.

DIFFERENT POLICIES FOR FINANCING CURRENT ASSETS In the real world, it is not likely that current assets will ever drop to zero. For example, a long-term rising level of sales will result in some permanent investment in current assets. Moreover, the firm's investments in long-term assets may show a great deal of variation.

A growing firm can be thought of as having a total asset requirement consisting of the current assets and long-term assets needed to run the business efficiently. The total asset requirement may exhibit change over time for many reasons, including (1) a general growth trend, (2) seasonal variation around the trend, and (3) unpredictable day-to-day and month-to-month fluctuations. This fluctuation is depicted in Figure 18.4. (We have not tried to show the unpredictable day-to-day and month-to-month variations in the total asset requirement.)

The peaks and valleys in Figure 18.4 represent the firm's total asset needs through time. For example, for a lawn and garden supply firm, the peaks might represent inventory build-ups prior to the spring selling season. The valleys would come about because of lower off-season inventories. There are two strategies such a firm might consider to meet its cyclical needs. First, the firm could keep a relatively large pool of marketable securities. As the need for inventory and other current assets began to rise, the firm would sell off marketable securities and use the cash to purchase whatever was needed. Once the inventory was sold and inventory holdings began to decline, the firm would reinvest in marketable securities.

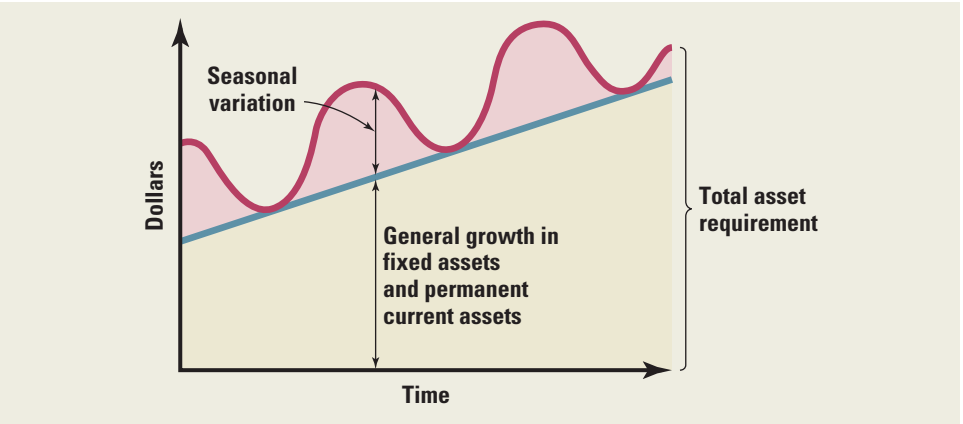
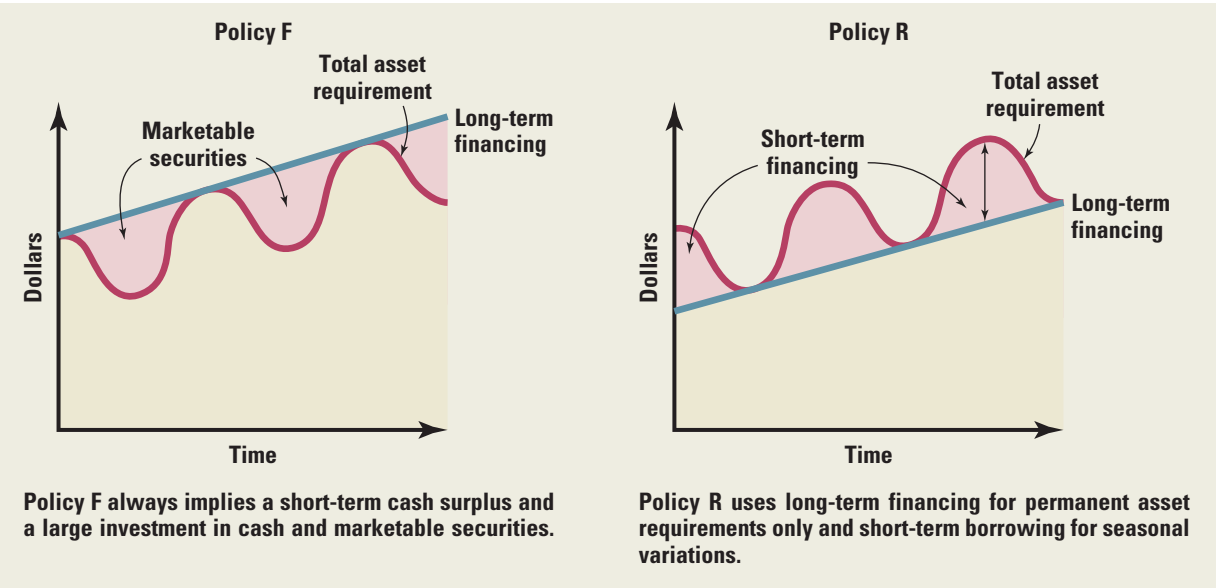


FIGURE 18.4
The Total Asset Requirement over Time

FIGURE 18.5
Alternative Asset Financing Policies



This approach is the flexible policy illustrated in Figure 18.5 as Policy F. Notice that the firm essentially uses a pool of marketable securities as a buffer against changing current asset needs.

At the other extreme, the firm could keep relatively little in marketable securities. As the need for inventory and other assets began to rise, the firm would simply borrow the needed cash on a short-term basis. The firm would repay the loans as the need for assets cycled back down. This approach is the restrictive policy illustrated in Figure 18.5 as Policy R.

In comparing the two strategies illustrated in Figure 18.5, notice that the chief difference is the way in which the seasonal variation in asset needs is financed. In the flexible case, the firm finances internally, using its own cash and marketable securities. In the restrictive case, the firm finances the variation externally, borrowing the needed funds on a short-term basis. As we discussed previously, all else being the same, a firm with a flexible policy will have a greater investment in net working capital.

Which Financing Policy Is Best?

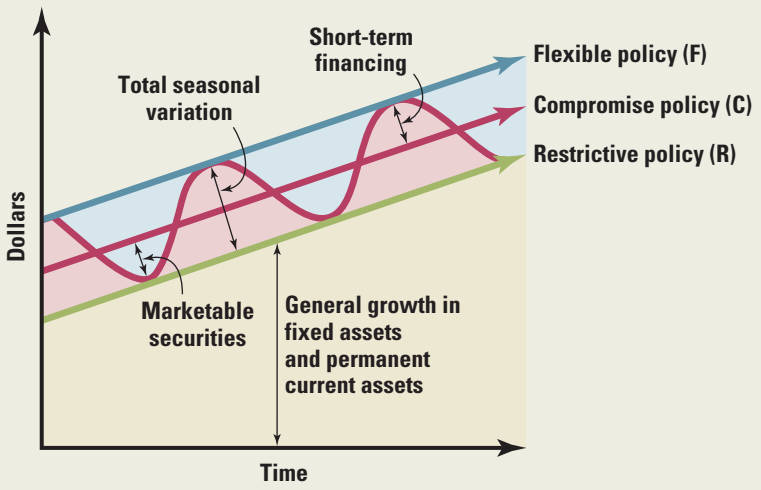
What is the most appropriate amount of short-term borrowing? There is no definitive answer. Several considerations must be included in a proper analysis:

1. *Cash Reserves*. The flexible financing policy implies surplus cash and little short-term borrowing. This policy reduces the probability that a firm will experience financial distress. Firms may not have to worry as much about meeting recurring, short-run obligations. However, investments in cash and marketable securities are zero net present value investments at best.
2. *Maturity Hedging*. Most firms attempt to match the maturities of assets and liabilities. They finance inventories with short-term bank loans and fixed assets with long-term financing. Firms tend to avoid financing long-lived assets with short-term borrowing. This type of maturity mismatching would necessitate frequent refinancing and is inherently risky because short-term interest rates are more volatile than longer-term rates.
3. *Relative Interest Rates*. Short-term interest rates are usually lower than long-term rates. This implies that it is, on average, more costly to rely on long-term borrowing as compared to short-term borrowing.

The two policies, F and R, we depict in Figure 18.5 are, of course, extreme cases. With F, the firm never does any short-term borrowing, and with R, the firm never has a cash reserve (an investment in marketable securities). Figure 18.6 illustrates these two policies along with a compromise, Policy C.

With this compromise approach, the firm borrows in the short term to cover peak financing needs, but it maintains a cash reserve in the form of marketable securities during slow periods. As current assets build up, the firm draws down this reserve before doing any short-term borrowing. This allows for some run-up in current assets before the firm has to resort to short-term borrowing.

FIGURE 18.6
A Compromise Financing Policy



With a compromise policy, the firm keeps a reserve of liquidity that it uses to initially finance seasonal variations in current asset needs. Short-term borrowing is used when the reserve is exhausted.

Current Assets and Liabilities in Practice

Short-term assets represent a significant portion of a typical firm's overall assets. For U.S. manufacturing, mining, and trade corporations, current assets were about 50 percent of total assets in the 1960s. Today, this figure is closer to 40 percent. Most of the decline is due to more efficient cash and inventory management. Over this same period, current liabilities rose from about 20 percent of total liabilities and equity to almost 30 percent. The result is that liquidity (as measured by the ratio of net working capital to total assets) has declined, signaling a move to more restrictive short-term policies.

18.4 THE CASH BUDGET

The **cash budget** is a primary tool in short-run financial planning. It allows the financial manager to identify short-term financial needs and opportunities. An important function of the cash budget is to help the manager explore the need for short-term borrowing. The idea of the cash budget is simple: It records estimates of cash receipts (cash in) and disbursements (cash out). The result is an estimate of the cash surplus or deficit.

Sales and Cash Collections

We start with an example involving the Fun Toys Corporation. We will prepare a quarterly cash budget. We could just as well use a monthly, weekly, or even daily basis. We choose quarters for convenience and also because a quarter is a common short-term business planning period. (Note that, throughout this example, all figures are in millions of dollars.)

All of Fun Toys' cash inflows come from the sale of toys. Cash budgeting for Fun Toys must therefore start with a sales forecast for the coming year, by quarter:

	Q1	Q2	Q3	Q4
Sales (in millions)	$200	$300	$250	$400

Note that these are predicted sales, so there is forecasting risk here, and actual sales could be more or less. Fun Toys started the year with accounts receivable equal to $120.

Fun Toys has a 45-day receivables, or average collection, period. This means that half of the sales in a given quarter will be collected the following quarter. This happens because sales made during the first 45 days of a quarter will be collected in that quarter, whereas sales made in the second 45 days will be collected in the next quarter. Note that we are assuming that each quarter has 90 days, so the 45-day collection period is the same as a half-quarter collection period.

Based on the sales forecasts, we now need to estimate Fun Toys' projected cash collections. First, any receivables that we have at the beginning of a quarter will be collected within 45 days, so all of them will be collected sometime during the quarter. Second, as we discussed, any sales made in the first half of the quarter will be collected, so total cash collections are:

$$\textbf{Cash collections} = \textbf{Beginning accounts receivable} + 1/2 \times \textbf{Sales} \qquad [18.6]$$

For example, in the first quarter, cash collections would be the beginning receivables of $120 plus half of sales, $1/2 \times \$200 = \$100$, for a total of $220.

Because beginning receivables are all collected along with half of sales, ending receivables for a particular quarter will be the other half of sales. First-quarter sales are projected at $200, so ending receivables will be $100. This will be the beginning receivables in the

TABLE 18.2
Cash Collection for Fun Toys (in millions)

	Q1	Q2	Q3	Q4
Beginning receivables	$120	$100	$150	$125
Sales	200	300	250	400
Cash collections	− 220	− 250	− 275	− 325
Ending receivables	100	150	125	200

Collections = Beginning receivables + 1/2 × Sales
Ending receivables = Beginning receivables + Sales − Collections
= 1/2 × Sales

second quarter. Cash collections in the second quarter will thus be $100 plus half of the projected $300 in sales, or $250 total.

Continuing this process, we can summarize Fun Toys' projected cash collections as shown in Table 18.2. In this table, collections are shown as the only source of cash. Of course, this need not be the case. Other sources of cash could include asset sales, investment income, and receipts from planned long-term financing.

Cash Outflows

Next, we consider the cash disbursements, or payments. These come in four basic categories:

1. *Payments of Accounts Payable*. These are payments for goods or services rendered by suppliers, such as raw materials. Generally, these payments will be made sometime after purchases.
2. *Wages, Taxes, and Other Expenses*. This category includes all other regular costs of doing business that require actual expenditures. Depreciation, for example, is often thought of as a regular cost of business, but it requires no cash outflow and is not included.
3. *Capital Expenditures*. These are payments of cash for long-lived assets.
4. *Long-Term Financing Expenses*. This category includes, for example, interest payments on long-term debt outstanding and dividend payments to shareholders.

Fun Toys' purchases from suppliers (in dollars) in a quarter are equal to 60 percent of the next quarter's predicted sales. Fun Toys' payments to suppliers are equal to the previous quarter's purchases, so the accounts payable period is 90 days. For example, in the quarter just ended, Fun Toys ordered .60 × $200 = $120 in supplies. This will actually be paid in the first quarter (Q1) of the coming year.

Wages, taxes, and other expenses are routinely 20 percent of sales; interest and dividends are currently $20 per quarter. In addition, Fun Toys plans a major plant expansion (a capital expenditure) costing $100 in the second quarter. If we put all this information together, the cash outflows are as shown in Table 18.3.

TABLE 18.3
Cash Disbursements for Fun Toys (in millions)

	Q1	Q2	Q3	Q4
Payment of accounts (60% of sales)	$120	$180	$150	$240
Wages, taxes, other expenses	40	60	50	80
Capital expenditures	0	100	0	0
Long-term financing expenses (interest and dividends)	20	20	20	20
Total cash disbursements	$180	$360	$220	$340

	Q1	Q2	Q3	Q4
Total cash collections	$220	$250	$275	$325
Total cash disbursements	180	360	220	340
Net cash inflow	$ 40	−$110	$ 55	−$ 15

TABLE 18.4
Net Cash Inflow for Fun Toys (in millions)

	Q1	Q2	Q3	Q4
Beginning cash balance	$20	$ 60	−$50	$ 5
Net cash inflow	40	− 110	55	− 15
Ending cash balance	$60	−$ 50	$ 5	−$10
Minimum cash balance	− 10	− 10	− 10	− 10
Cumulative surplus (deficit)	$50	−$ 60	−$ 5	−$20

TABLE 18.5
Cash Balance for Fun Toys (in millions)

The Cash Balance

The predicted *net cash inflow* is the difference between cash collections and cash disbursements. The net cash inflow for Fun Toys is shown in Table 18.4. What we see immediately is that there is a cash surplus in the first and third quarters and a cash deficit in the second and fourth.

We will assume that Fun Toys starts the year with a $20 cash balance. Furthermore, Fun Toys maintains a $10 minimum cash balance to guard against unforeseen contingencies and forecasting errors. So, the company starts the first quarter with $20 in cash. This amount rises by $40 during the quarter, and the ending balance is $60. Of this, $10 is reserved as a minimum, so we subtract it out and find that the first quarter surplus is $60 − 10 = $50.

Fun Toys starts the second quarter with $60 in cash (the ending balance from the previous quarter). There is a net cash inflow of −$110, so the ending balance is $60 − 110 = −$50. We need another $10 as a buffer, so the total deficit is −$60. These calculations and those for the last two quarters are summarized in Table 18.5.

At the end of the second quarter, Fun Toys has a cash shortfall of $60. This occurs because of the seasonal pattern of sales (higher towards the end of the second quarter), the delay in collections, and the planned capital expenditure.

The cash situation at Fun Toys is projected to improve to a $5 deficit in the third quarter, but, by year's end, Fun Toys still has a $20 deficit. Without some sort of financing, this deficit will carry over into the next year. We explore this subject in the next section.

For now, we can make the following general comments on Fun Toys' cash needs:

1. Fun Toys' large outflow in the second quarter is not necessarily a sign of trouble. It results from delayed collections on sales and a planned capital expenditure (presumably a worthwhile one).
2. The figures in our example are based on a forecast. Sales could be much worse (or better) than the forecasted figures.

18.5 SHORT-TERM BORROWING

Fun Toys has a short-term financing problem. It cannot meet the forecasted cash outflows in the second quarter using internal sources. How it will finance that shortfall depends on its financial policy. With a very flexible policy, Fun Toys might seek up to $60 million in long-term debt financing.

In addition, note that much of the cash deficit comes from the large capital expenditure. Arguably, this is a candidate for long-term financing. Nonetheless, because we have

discussed long-term financing elsewhere, we will concentrate here on four short-term borrowing options: (1) unsecured borrowing, (2) secured borrowing, (3) commercial paper, and (4) trade credit.

Unsecured Loans

The most common way to finance a temporary cash deficit is to arrange a short-term unsecured bank loan. Firms that use short-term bank loans often arrange for a line of credit. A **line of credit** is an agreement under which a firm is authorized to borrow up to a specified amount. To ensure that the line is used for short-term purposes, the lender will sometimes require the borrower to pay the line down to zero and keep it there for some period during the year, typically 60 days (called a *cleanup period*).

Short-term lines of credit are classified as either *committed* or *noncommitted*. The latter type is an informal arrangement that allows firms to borrow up to a previously specified limit without going through the normal paperwork (much as they would with a credit card). A *revolving credit arrangement* (or just *revolver*) is similar to a line of credit, but it is usually open for two or more years, whereas a line of credit would usually be evaluated on an annual basis.

Committed lines of credit are more formal legal arrangements and usually involve a commitment fee paid by the firm to the bank (usually the fee is on the order of .25 percent of the total committed funds per year). The interest rate on the line of credit is usually set equal to the bank's prime lending rate plus an additional percentage, and the rate will usually float. A firm that pays a commitment fee for a committed line of credit is essentially buying insurance to guarantee that the bank can't back out of the agreement (absent some material change in the borrower's status).

COMPENSATING BALANCES As a part of a credit line or other lending arrangement, banks will sometimes require that the firm keep some amount of money on deposit. This is called a compensating balance. A **compensating balance** is some of the firm's money kept by the bank in low-interest or noninterest-bearing accounts. By leaving these funds with the bank and receiving little or no interest, the firm further increases the effective interest rate earned by the bank on the line of credit, thereby "compensating" the bank. A compensating balance might be on the order of 2 to 5 percent of the amount borrowed.

Firms also use compensating balances to pay for noncredit bank services such as cash management services. A traditionally contentious issue is whether the firm should pay for bank credit and noncredit services with fees or with compensating balances. Most major firms have now negotiated for banks to use the corporation's collected funds for compensation and use fees to cover any shortfall. Arrangements such as this one and some similar approaches discussed in the next chapter make the subject of minimum balances less of an issue than it once was.

COST OF A COMPENSATING BALANCE A compensating balance requirement has an obvious opportunity cost because the money often must be deposited in an account with a zero or low interest rate. For example, suppose that we have a $100,000 line of credit with a 10 percent compensating balance requirement. This means that 10 percent of the amount actually used must be left on deposit in a noninterest-bearing account.

The quoted interest rate on the credit line is 16 percent. Suppose we need $54,000 to purchase some inventory. How much do we have to borrow? What interest rate are we effectively paying?

If we need $54,000, we have to borrow enough so that $54,000 is left over after we take out the 10 percent compensating balance:

$$\$54{,}000 = (1 - .10) \times \text{Amount borrowed}$$
$$\$60{,}000 = \$54{,}000/.90 = \text{Amount borrowed}$$

The interest on the $60,000 for one year at 16 percent is $60,000 × .16 = $9,600. We're actually only getting $54,000 to use, so the effective interest rate is:

Effective interest rate = Interest paid/Amount available
= $9,600/54,000
= 17.78%

Notice that what effectively happens here is that we pay 16 cents in interest on every 90 cents we borrow because we don't get to use the 10 cents tied up in the compensating balance. The interest rate is thus .16/.90 = 17.78 percent, as we calculated.

Several points bear mentioning. First, compensating balances are usually computed as a monthly *average* of the daily balances. This means that the effective interest rate may be lower than our example illustrates. Second, it has become common for compensating balances to be based on the *unused* amount of the credit line. The requirement of such a balance amounts to an implicit commitment fee. Third, and most important, the details of short-term business lending arrangements are highly negotiable. Banks will generally work with firms to design a package of fees and interest.

LETTERS OF CREDIT A *letter of credit* is a common arrangement in international finance. With a letter of credit, the bank issuing the letter promises to make a loan if certain conditions are met. Typically, the letter guarantees payment on a shipment of goods provided that the goods arrive as promised. A letter of credit can be revocable (subject to cancellation) or irrevocable (not subject to cancellation if the specified conditions are met).

Secured Loans

Banks and other finance companies often require security for a short-term loan just as they do for a long-term loan. Security for short-term loans usually consists of accounts receivable, inventories, or both.

ACCOUNTS RECEIVABLE FINANCING **Accounts receivable financing** involves either *assigning* receivables or *factoring* receivables. Under assignment, the lender has the receivables as security, but the borrower is still responsible if a receivable can't be collected. With *conventional factoring,* the receivable is discounted and sold to the lender (the factor). Once it is sold, collection is the factor's problem, and the factor assumes the full risk of default on bad accounts. With *maturity factoring,* the factor forwards the money on an agreed-upon future date.

Factors play a particularly important role in the retail industry. Retailers in the clothing business, for example, must buy large amounts of new clothes at the beginning of the season. Because this is typically a long time before they have sold anything, they wait to pay their suppliers, sometimes 30 to 60 days. If an apparel maker can't wait that long, it turns to factors, who buy the receivables and take over collection. In fact, the garment industry accounts for about 80 percent of all factoring in the United States.

For more on factoring, see www.factoring.com.

EXAMPLE 18.3

Cost of Factoring

For the year just ended, LuLu's Pies had an average of $50,000 in accounts receivable. Credit sales were $500,000. LuLu's factors its receivables by discounting them 3 percent, in other words, by selling them for 97 cents on the dollar. What is the effective interest rate on this source of short-term financing?

To determine the interest rate, we first have to know the accounts receivable, or average collection, period. During the year, LuLu's turned over its receivables $500,000/50,000 = 10 times. The average collection period is therefore 365/10 = 36.5 days.

(*continued*)

The interest paid here is a form of discount interest (discussed in Chapter 4). In this case, LuLu's is paying 3 cents in interest on every 97 cents of financing. The interest rate per 36.5 days is thus .03/.97 = 3.09 percent. The APR is 10 × 3.09 percent = 30.9 percent, but the effective annual rate is:

$$EAR = 1.0309^{10} - 1 = 35.6\%$$

Factoring is a relatively expensive source of money in this case.

We should note that, if the factor takes on the risk of default by a buyer, then the factor is providing insurance as well as immediate cash. More generally, the factor essentially takes over the firm's credit operations. This can result in a significant savings. The interest rate we calculated is therefore overstated, particularly if default is a significant possibility.

INVENTORY LOANS **Inventory loans**, short-term loans to purchase inventory, come in three basic forms: blanket inventory liens, trust receipts, and field warehouse financing:

1. *Blanket Inventory Lien*. A blanket lien gives the lender a lien against all the borrower's inventories (the blanket "covers" everything).
2. *Trust Receipt*. A trust receipt is a device by which the borrower holds specific inventory in "trust" for the lender. Automobile dealer financing, for example, is done by use of trust receipts. This type of secured financing is also called *floor planning,* in reference to inventory on the showroom floor. However, it is somewhat cumbersome to use trust receipts for, say, wheat grain.
3. *Field Warehouse Financing*. In field warehouse financing, a public warehouse company (an independent company that specializes in inventory management) acts as a control agent to supervise the inventory for the lender.

Commercial Paper

There are a variety of other sources of short-term funds employed by corporations. One of the most important, especially for certain very large corporations, is *commercial paper*.

Commercial paper consists of short-term notes issued by large and highly rated firms. Typically, these notes are of short maturity, ranging up to 270 days (beyond that limit, the firm must file a registration statement with the SEC). Because the firm issues these directly and because it usually backs the issue with a special bank line of credit, the interest rate the firm obtains is often significantly below the rate a bank would charge for a direct loan.

Trade Credit

Another very important source of short-term financing for firms of all sizes is *trade credit,* meaning accounts payable. Such payables amount to money borrowed from suppliers, and small firms in particular rely heavily on suppliers for short-term credit. Trade credit is important for large firms as well; retailing giant Walmart uses more trade credit than it does money borrowed from banks.

UNDERSTANDING TRADE CREDIT TERMS The easiest way to understand trade credit terms is to consider an example. For bulk candy, terms of 2/10, net 60, might be quoted.[5] This means that customers have 60 days from the invoice date (discussed next) to pay the full amount. However, if payment is made within 10 days, a 2 percent cash discount can be taken.

Consider a buyer who places an order for $1,000, and assume that the terms of the sale are 2/10, net 60. The buyer has the option of paying $1,000 × (1 − .02) = $980 in 10 days, or paying the full $1,000 in 60 days. If the terms were stated as just net 30, then the customer would have 30 days from the invoice date to pay the entire $1,000, and no discount would be offered for early payment.

[5]The terms of sale cited from specific industries in this section and elsewhere are drawn from Theodore N. Beckman, *Credits and Collections: Management and Theory* (New York: McGraw-Hill, 1962).

In general, credit terms are interpreted in the following way:

(Take this discount off the invoice price)/(if you pay in this many days),
(or else pay the full invoice amount in this many days)

Thus, 5/10, net 45, means take a 5 percent discount from the full price if you pay within 10 days, or else pay the full amount in 45 days.

CASH DISCOUNTS As we have seen, **cash discounts** are often part of the terms of sale. The practice of granting discounts for cash purchases in the United States dates to the Civil War and is widespread today. One reason discounts are offered is to speed up the collection of receivables and reduce the amount of credit being offered (and the potential losses from defaults).

Notice that when a cash discount is offered, the credit is essentially free during the discount period. The buyer pays for the credit only after the discount expires. With 2/10, net 30, a rational buyer either pays in 10 days to make the greatest possible use of the free credit or pays in 30 days to get the longest possible use of the money in exchange for giving up the discount. So, by giving up the discount, the buyer effectively gets $30 - 10 = 20$ days' credit.

Another reason for cash discounts is that they provide a way of charging higher prices to customers who have had credit extended to them. In this sense, cash discounts are a convenient way of charging for the credit granted to customers.

In our examples, it might seem that the discounts are rather small. With 2/10, net 30, for example, early payment only gets the buyer a 2 percent discount. Does this provide a significant incentive for early payment? The answer is yes, because the implicit interest rate is extremely high.

To see why the discount is important, we will calculate the cost to the buyer of *not* paying early. To do this, we will find the interest rate that the buyer is effectively paying for the trade credit. Suppose the order is for $1,000. The buyer can pay $980 in 10 days or wait another 20 days and pay $1,000. It's obvious that the buyer is effectively borrowing $980 for 20 days and paying $20 in interest on the "loan." What's the interest rate?

With $20 in interest on $980 borrowed, the rate is $20/980 = 2.0408%. This is relatively low, but remember that this is the rate per 20-day period. There are 365/20 = 18.25 such periods in a year, so, by not taking the discount, the buyer is paying an effective annual rate of:

$$\text{EAR} = 1.020408^{18.25} - 1 = 44.6\%$$

From the buyer's point of view, this is an expensive source of financing!

Given that the interest rate is so high here, it is unlikely that the seller benefits from early payment. Ignoring the possibility of default by the buyer, the decision by a customer to forgo the discount almost surely works to the seller's advantage.

EXAMPLE 18.4

What's the Rate?

Ordinary tiles are often sold with terms of 3/30, net 60. What effective annual rate does a buyer pay by not taking the discount? What would the APR be if one were quoted?

Here we have 3 percent discount interest on $60 - 30 = 30$ days' credit. The rate per 30 days is .03/.97 = 3.093%. There are 365/30 = 12.17 such periods in a year, so the effective annual rate is:

$$\text{EAR} = 1.03093^{12.17} - 1 = 44.9\%$$

The APR, as always, would be calculated by multiplying the rate per period by the number of periods:

$$\text{APR} = .03093 \times 12.17 = 37.6\%$$

An interest rate calculated like this APR is often quoted as the cost of the trade credit and, as this example illustrates, can seriously understate the true cost.

TABLE 18.6
Short-Term Financial Plan for Fun Toys (in millions)

	Q1	Q2	Q3	Q4
Beginning cash balance	$20	$ 60	$10	$10.0
Net cash inflow	40	− 110	55	− 15.0
New short-term borrowing	—	60	—	15.4
Interest on short-term borrowing	—	—	− 3	− .4
Short-term borrowing repaid	—	—	−52	—
Ending cash balance	$60	$ 10	$10	$10.0
Minimum cash balance	− 10	− 10	− 10	− 10.0
Cumulative surplus (deficit)	$50	$ 0	$ 0	$ 0.0
Beginning short-term borrowing	0	0	60	8.0
Change in short-term debt	0	60	− 52	15.4
Ending short-term debt	$ 0	$ 60	$ 8	$23.4

18.6 A SHORT-TERM FINANCIAL PLAN

To illustrate a completed short-term financial plan, we will assume that Fun Toys arranges to borrow any needed funds on a short-term basis. The interest rate is a 20 percent APR, and it is calculated on a quarterly basis. From Chapter 4, we know that the rate is 20 percent/4 = 5 percent per quarter. We will assume that Fun Toys starts the year with no short-term debt.

From Table 18.5, we know that Fun Toys has a second-quarter deficit of $60 million. The firm will have to borrow this amount. Net cash inflow in the following quarter is $55 million. The firm will now have to pay $60 million × .05 = $3 million in interest out of that, leaving $52 million to reduce the borrowing.

Fun Toys still owes $60 million − 52 million = $8 million at the end of the third quarter. Interest in the last quarter will thus be $8 million × .05 = $.4 million. In addition, net inflows in the last quarter are −$15 million, so the company will have to borrow a total of $15.4 million, bringing total borrowing up to $15.4 million + 8 million = $23.4 million. Table 18.6 extends Table 18.5 to include these calculations.

Notice that the ending short-term debt is just equal to the cumulative deficit for the entire year, $20 million, plus the interest paid during the year, $3 million + .4 million = $3.4 million, for a total of $23.4 million.

Our plan is very simple. For example, we ignored the fact that the interest paid on the short-term debt is tax deductible. We also ignored the fact that the cash surplus in the first quarter would earn some interest (which would be taxable). We could add on a number of refinements. Even so, our plan highlights the fact that in about 90 days, Fun Toys will need to borrow $60 million or so on a short-term basis. It's time to start lining up the source of the funds.

Our plan also illustrates that financing the firm's short-term needs will cost about $3.4 million in interest (before taxes) for the year. This is a starting point for Fun Toys to begin evaluating alternatives to reduce this expense. For example, can the $100 million planned expenditure be postponed or spread out? At 5 percent per quarter, short-term credit is expensive.

Also, if Fun Toys' sales are expected to keep growing, then the deficit of $20 million-plus will probably also keep growing, and the need for additional financing will be permanent. Fun Toys may wish to think about raising money on a long-term basis to cover this need.

SUMMARY AND CONCLUSIONS

1. This chapter has introduced the management of short-term finance. Short-term finance involves short-lived assets and liabilities. We trace and examine the short-term sources and uses of cash as they appear on the firm's financial statements. We see how current assets and current liabilities arise in the short-term operating activities and the cash cycle of the firm.
2. Managing short-term cash flows involves the minimizing of costs. The two major costs are carrying costs, the return forgone by keeping too much invested in short-term assets such as cash, and shortage costs, the cost of running out of short-term assets. The objective of managing short-term finance and doing short-term financial planning is to find the optimal trade-off between these two costs.
3. In an ideal economy, the firm could perfectly predict its short-term uses and sources of cash, and net working capital could be kept at zero. In the real world, cash and net working capital provide a buffer that lets the firm meet its ongoing obligations. The financial manager seeks the optimal level of each of the current assets.
4. The financial manager can use the cash budget to identify short-term financial needs. The cash budget tells the manager what borrowing is required or what lending will be possible in the short run. The firm has available to it a number of possible ways of acquiring funds to meet short-term shortfalls, including unsecured and secured loans, commercial paper, and trade credit.

CONCEPT QUESTIONS

1. **Operating Cycle** What are some of the characteristics of a firm with a long operating cycle?
2. **Cash Cycle** What are some of the characteristics of a firm with a long cash cycle?
3. **Sources and Uses** For the year just ended, you have gathered the following information on the Holly Corporation:
   - **a.** A $200 dividend was paid.
   - **b.** Accounts payable increased by $500.
   - **c.** Fixed asset purchases were $900.
   - **d.** Inventories increased by $625.
   - **e.** Long-term debt decreased by $1,200.

   Label each as a source or use of cash and describe its effect on the firm's cash balance.
4. **Cost of Current Assets** Loftis Manufacturing, Inc., has recently installed a just-in-time (JIT) inventory system. Describe the effect this is likely to have on the company's carrying costs, shortage costs, and operating cycle.
5. **Operating and Cash Cycles** Is it possible for a firm's cash cycle to be longer than its operating cycle? Explain why or why not.
6. **Shortage Costs** What are the costs of shortages? Describe them.
7. **Reasons for Net Working Capital** In an ideal economy, net working capital is always zero. Why might net working capital be positive in a real economy?

Use the following information to answer Questions 8–12: Last month, BlueSky Airline announced that it would stretch out its bill payments to 45 days from 30 days. The reason given was that the company wanted to "control costs and optimize cash flow." The increased payables period will be in effect for all of the company's 4,000 suppliers.