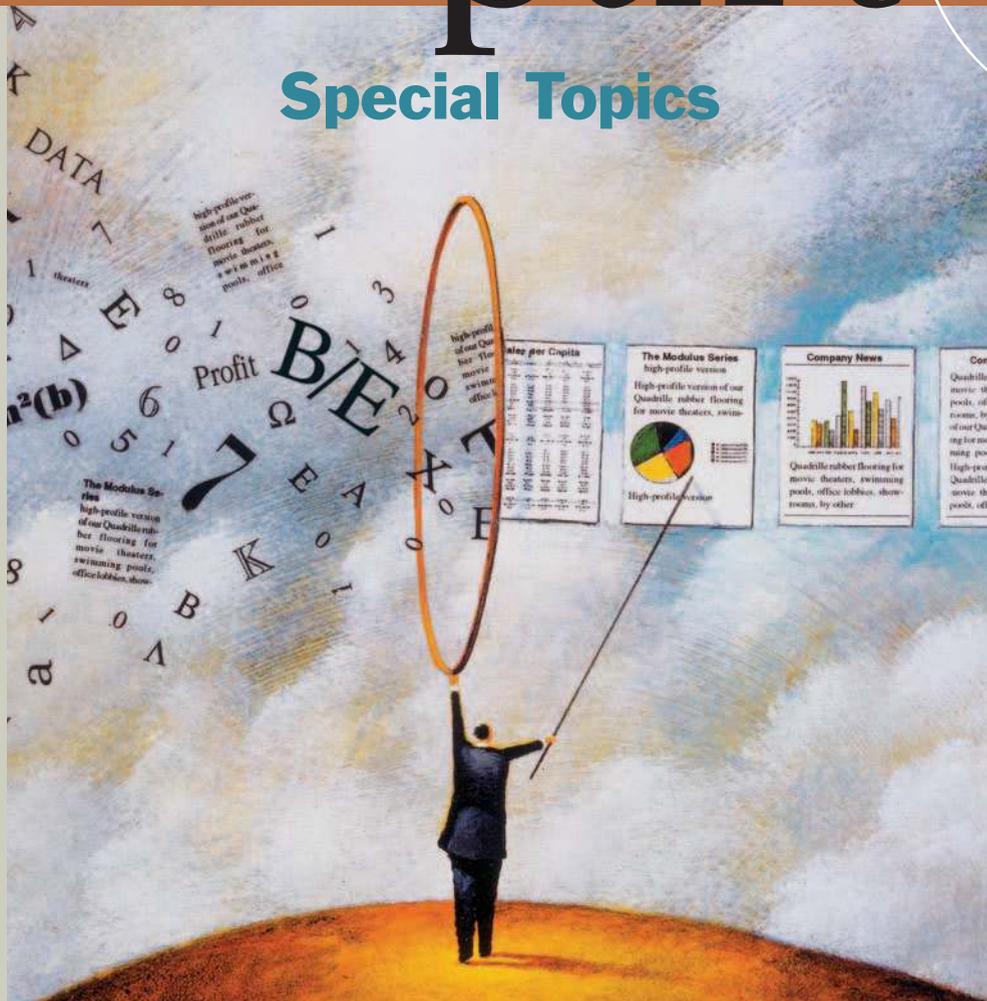
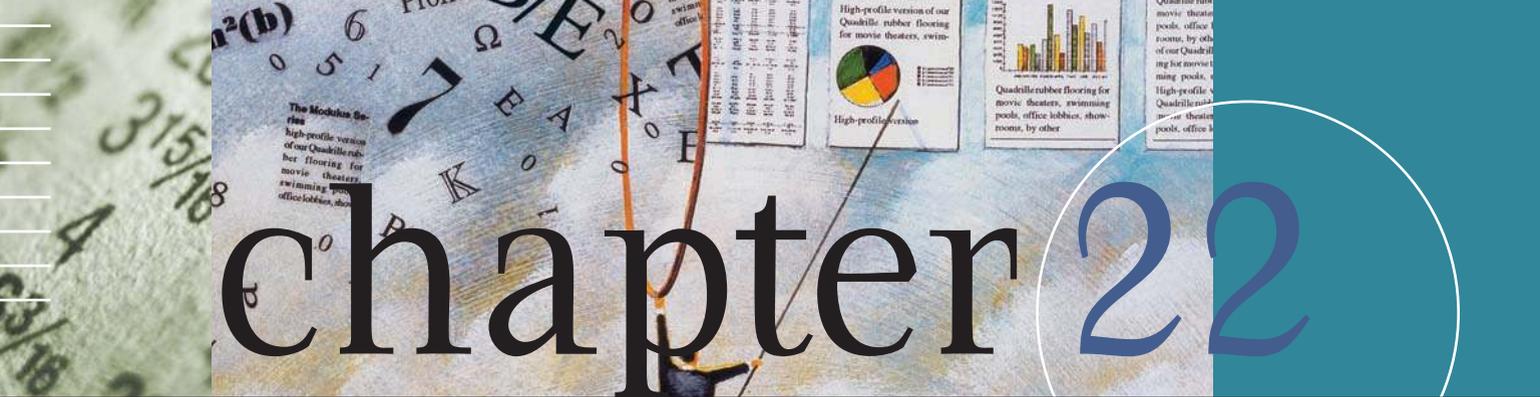


part 7

Special Topics



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chapter 22

Working Capital Management

What do Qualcomm, Brightpoint, Quanex, Dell, 7 Eleven, and Best Buy have in common? Each of these companies led its industry in *CFO* magazine's latest annual survey of working capital management, which covered the 1,000 largest U.S. publicly traded firms. Each company is rated on the number of days tied up in working capital (DWC), defined as (Receivables + Inventory – Payables)/Daily sales.

The typical DWC ratio is about 55, but some companies have much lower ratios. For example, Dell, Apple Computer, and Anadarko Petroleum are among the relatively few companies that have negative DWC! This means that these companies have less in receivables and inventory than they do in payables. In other words, they get paid by their customers before they have to pay their suppliers, so their suppliers are in effect financing their operations.

How can a company drive its DWC down? Qualcomm focuses on continuous improvement in its working capital management. Due

to a big improvement in the accuracy of its customer invoices and better training for its collections specialists, Qualcomm speeded up its collections and thus reduced its days sales outstanding from over 42 days to 35 days, a 19% improvement.

Brightpoint has taken a multi-pronged approach. With better processes to analyze its customers' credit risks, Brightpoint now has fewer slow-paying or uncollectable accounts. It has also installed supply-chain-management software that is used to pull its customers' sales data into its own system, which has helped lower its own inventory because it can now forecast its sales more accurately.

Nucor, one of the best in its industry at managing working capital, has tied bonuses to each business unit's return on assets. Lower working capital means a smaller asset base and a higher ROA, so Nucor's employees increase their take-home pay if they reduce working capital.

Keep these companies and their techniques in mind as you read this chapter.

Working capital management involves two basic questions: (1) What is the appropriate amount of working capital, both in total and for each specific account, and (2) how should working capital be financed? Note that sound working capital management goes beyond finance. Indeed, the procedures for improving working capital management generally stem from other disciplines. For example, experts in logistics, operations management, and information technology often work with marketing people to develop better ways to deliver the firm's products. Also, engineers and production specialists develop ways to speed up the manufacturing process and thus reduce the goods-in-process inventory. Finance comes into play in evaluating how effective a firm's operating departments are in relation to others in its industry and in evaluating the profitability of alternative proposals made to improve working capital management. In addition, financial managers determine how much cash a company must keep on hand and how much short-term financing it should use.

Here are some basic definitions and concepts:

1. **Working capital**, sometimes called *gross working capital*, simply refers to current assets used in operations.
2. **Net working capital** is defined as current assets minus current liabilities.
3. **Net operating working capital (NOWC)** is defined as operating current assets minus operating current liabilities. Generally, NOWC is equal to cash, accounts receivable, and inventories, less accounts payable and accruals. Marketable securities and other short-term investments are generally not considered to be operating current assets, hence they are generally excluded when NOWC is calculated.



e-resource

The textbook's Web site contains an *Excel* file that will guide you through the chapter's calculations. The file for this chapter is **FM12 Ch 22 Tool Kit.xls**, and we encourage you to open the file and follow along as you read the chapter.

22.1 The Cash Conversion Cycle

Firms typically follow a cycle in which they purchase inventory, sell goods on credit, and then collect accounts receivable. This cycle is referred to as the *cash conversion cycle (CCC)*.

Calculating the CCC

Consider Real Time Computer Corporation (RTC), which in early 2007 introduced a new minicomputer that can perform 100 billion instructions per second and that

Corporate Valuation and Working Capital Management

Superior working capital management can dramatically reduce required investments in operations, which, in turn, can lead to larger free cash flows and greater firm value.

$$\text{Value} = \frac{\text{FCF}_1}{(1 + \text{WACC})^1} + \frac{\text{FCF}_2}{(1 + \text{WACC})^2} + \frac{\text{FCF}_3}{(1 + \text{WACC})^3} + \cdots + \frac{\text{FCF}_\infty}{(1 + \text{WACC})^\infty}$$

will sell for \$250,000. RTC expects to sell 40 computers in its first year of production. The effects of this new product on RTC's working capital position were analyzed in terms of the following five steps:

1. RTC will order and then receive the materials it needs to produce the 40 computers it expects to sell. Because RTC and most other firms purchase materials on credit, this transaction will create an account payable. However, the purchase will have no immediate cash flow effect.
2. Labor will be used to convert the materials into finished computers. However, wages will not be fully paid at the time the work is done, so, like accounts payable, accrued wages will also build up.
3. The finished computers will be sold, but on credit. Therefore, sales will create receivables, not immediate cash inflows.
4. At some point before receivables are collected, RTC must pay off its accounts payable and accrued wages. This outflow must be financed.
5. The cycle will be completed when RTC's receivables have been collected. At that time, the company can pay off the credit that was used to finance production, and it can then repeat the cycle.

The **cash conversion cycle model**, which focuses on the length of time between when the company makes payments and when it receives cash inflows, formalizes the steps outlined above. The following terms are used in the model:

1. **Inventory conversion period**, which is the average time required to convert materials into finished goods and then to sell those goods. Note that the inventory conversion period is calculated by dividing inventory by sales per day. For example, if average inventories are \$2 million and sales are \$10 million, then the inventory conversion period is 73 days:

$$\begin{aligned}
 \text{Inventory conversion period} &= \frac{\text{Inventory}}{\text{Sales per day}} && \text{(22-1)} \\
 &= \frac{\$2,000,000}{\$10,000,000/365} \\
 &= 73 \text{ days.}
 \end{aligned}$$

Thus, it takes an average of 73 days to convert materials into finished goods and then to sell those goods.¹

2. **Receivables collection period**, which is the average length of time required to convert the firm's receivables into cash, that is, to collect cash following a sale. The receivables collection period is also called the *days sales outstanding (DSO)*, and it is calculated by dividing accounts receivable by the average credit sales per day. If receivables are \$657,534 and sales are \$10 million, the receivables collection period is

¹Some analysts define the inventory conversion period as inventory divided by daily cost of goods sold. However, most published sources use the formula we show in Equation 22-1. In addition, some analysts use a 360-day year; however, unless stated otherwise, we will base all our calculations on a 365-day year.

$$\begin{aligned}
 \text{Receivables collection period} = \text{DSO} &= \frac{\text{Receivables}}{\text{Sales}/365} && \text{(22-2)} \\
 &= \frac{\$657,534}{\$10,000,000/365} \\
 &= 24 \text{ days.}
 \end{aligned}$$

Thus, it takes 24 days after a sale to convert the receivables into cash.

3. **Payables deferral period**, which is the average length of time between the purchase of materials and labor and the payment of cash for them. For example, if the firm on average has 30 days to pay for labor and materials, if its cost of goods sold is \$8 million per year, and if its accounts payable average is \$657,534, then its payables deferral period can be calculated as follows:

$$\begin{aligned}
 \text{Payables deferral period} &= \frac{\text{Payables}}{\text{Purchases per day}} && \text{(22-3)} \\
 &= \frac{\text{Payables}}{\text{Cost of goods sold}/365} \\
 &= \frac{\$657,534}{\$8,000,000/365} \\
 &= 30 \text{ days.}
 \end{aligned}$$

The calculated figure is consistent with the stated 30-day payment period.²

4. **Cash conversion cycle**, which nets out the three periods just defined and therefore equals the length of time between the firm's actual cash expenditures to pay for productive resources (materials and labor) and its own cash receipts from the sale of products (that is, the length of time between paying for labor and materials and collecting on receivables). The cash conversion cycle thus equals the average length of time a dollar is tied up.

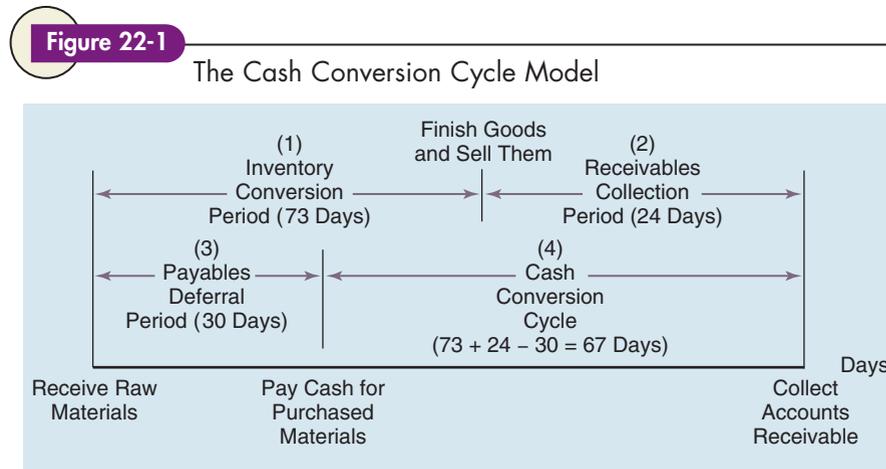
We can now use these definitions to analyze the cash conversion cycle. First, the concept is diagrammed in Figure 22-1. Each component is given a number, and the cash conversion cycle can be expressed by this equation:

$$\begin{aligned}
 (1) \quad + \quad (2) \quad - \quad (3) \quad = \quad (4) \\
 \text{Inventory} \quad \text{Receivables} \quad \text{Payables} \quad \text{Cash} \\
 \text{conversion} + \quad \text{collection} - \quad \text{deferral} = \text{conversion.} &&& \text{(22-4)} \\
 \text{period} \quad \text{period} \quad \text{period} \quad \text{cycle}
 \end{aligned}$$

To illustrate, suppose it takes Real Time an average of 73 days to convert raw materials to computers and then to sell them, and another 24 days to collect on receivables. However, 30 days normally elapse between receipt of raw materials and payment for them. Therefore, the cash conversion cycle would be 67 days:

$$\text{Days in cash conversion cycle} = 73 \text{ days} + 24 \text{ days} - 30 \text{ days} = 67 \text{ days.}$$

²Some sources define the payables deferral period as payables divided by daily sales.



To look at it another way,

$$\begin{aligned} \text{Cash inflow delay} - \text{Payment delay} &= \text{Net delay} \\ (73 \text{ days} + 24 \text{ days}) - 30 \text{ days} &= 67 \text{ days}. \end{aligned}$$

Shortening the Cash Conversion Cycle

Given these data, RTC knows when it starts producing a computer that it will have to finance the manufacturing costs for a 67-day period. The firm's goal should be to shorten its cash conversion cycle as much as possible without hurting operations. This would increase RTC's value, because the shorter the cash conversion cycle, the lower the required net operating working capital and the higher the resulting free cash flow.

The cash conversion cycle can be shortened (1) by reducing the inventory conversion period by processing and selling goods more quickly, (2) by reducing the receivables collection period by speeding up collections, or (3) by lengthening the payables deferral period by slowing down the firm's own payments. To the extent that these actions can be taken *without increasing costs or depressing sales*, they should be carried out.

Benefits

We can illustrate the benefits of shortening the cash conversion cycle by looking again at Real Time Computer Corporation. As shown in Table 22-1, RTC currently has \$2 million tied up in net operating working capital. Suppose RTC can improve its logistics and production processes so that its inventory conversion period drops to 65 days. The firm can also cut its receivable collection period to 23 days by billing customers daily rather than batching bills every other day as it now does. Finally, it can increase its payables deferral period by using remote disbursements, as discussed later in this chapter. Table 22-1 shows that the net effects of these improvements are a 10-day reduction in the cash conversion cycle and a \$268,493 reduction in net operating capital.

Recall that free cash flow (FCF) is equal to NOPAT minus the net investments in operating capital. Therefore, if working capital decreases, FCF increases by that same amount. RTC's reduction in its cash conversion cycle would lead to a

Table 22-1

Benefits from Improving the Cash Conversion Cycle

	Original	Improved
Annual sales	\$10,000,000	\$10,000,000
Cost of goods sold (COGS)	8,000,000	8,000,000
Inventory conversion period (days)	73	65
Receivables collection period (days)	24	23
Payable deferral period (days)	(30)	(31)
Cash conversion cycle (days)	<u>67</u>	<u>57</u>
Inventory ^a	\$ 2,000,000	\$ 1,780,822
Receivables ^b	657,534	630,137
Payables ^c	(657,534)	(679,452)
Net operating working capital (NOWC)	<u>\$ 2,000,000</u>	<u>\$ 1,731,507</u>
Improvement in free cash flow = Original NOWC – Improved NOWC		<u>\$ 268,493</u>

Notes:
^aInventory = (Inventory conversion period)(Sales/365)
^bReceivables = (Receivables collection period)(Sales/365)
^cPayables = (Payables deferral period)(COGS/365)

\$268,493 increase in FCF. If sales stay at the same level, then the reduction in working capital would simply be a one-time cash inflow. However, suppose sales grow. When a company improves its working capital processes, they usually remain at their improved level. If the NOWC/Sales ratio remains at its new level, proportionately less working capital will be required to support the additional future sales, leading to an increase in projected FCF for each future year.

For example, if RTC's sales and costs increase next year by 10%, then its NOWC would also increase by 10%. Under the original working capital situation, the projected NOWC would be $1.10(\$2,000,000) = \$2,200,000$, which means RTC would have to make an investment of $\$2,200,000 - \$2,000,000 = \$200,000$ in new working capital. Under the improved scenario, the projected NOWC would be $1.10(\$1,731,507) = \$1,904,658$. Its new projected investment is only $\$1,904,658 - \$1,731,507 = \$173,151$, which is $\$26,849$ less than was required under the original scenario ($\$2,000,000 - \$1,731,507 = \$268,493$). As this example shows, not only does the improvement in working capital processes produce a one-time free cash flow of $\$268,493$ at the time of the improvement, but it also leads to an improved FCF of $\$26,849$ in the next year, with additional improvements in future years. Therefore, an improvement in working capital management is a gift that keeps on giving.

The combination of the one-time cash inflow and the long-term improvement in free cash flow can add substantial value to a company. Two professors, Hyun-Han Shin and Luc Soenen, studied more than 2,900 companies during a recent 20-year period and found a strong relationship between a company's cash conversion cycle and its performance.³ In particular, their results show that for the average

³See Hyun-Han Shin and Luc Soenen, "Efficiency of Working Capital Management and Corporate Profitability," *Financial Practice and Education*, Fall/Winter 1998, pp. 37–45.

company a 10-day improvement in the cash conversion cycle was associated with an increase in pre-tax operating profit margin from 12.7% to 13.02%. They also demonstrated that companies with a cash conversion cycle 10 days shorter than average also had an annual stock return that was 1.7 percentage points higher than that of an average company, even after adjusting for differences in risk. Given results like these, it's no wonder firms now place so much emphasis on working capital management!⁴

SELF-TEST

Define the following terms: inventory conversion period, receivables collection period, and payables deferral period. Give the equation for each term.

What is the cash conversion cycle? What is its equation?

What should a firm's goal be regarding the cash conversion cycle? Explain your answer.

What are some actions a firm can take to shorten its cash conversion cycle?

A company has \$20 million in inventory, \$5 million in receivables, and \$4 million in payables. Its annual sales revenue is \$80 million and its cost of goods sold is \$60 million. What is its CCC? (89.73)

22.2 Alternative Net Operating Working Capital Policies

A **relaxed working capital policy** is one in which relatively large amounts of cash and inventories are carried, where sales are stimulated by the use of a credit policy that provides liberal financing to customers and a corresponding high level of receivables, and where a company doesn't take advantage of credit provided by accruals and accounts payable. Conversely, with a **restricted working capital policy**, the holdings of cash, inventories, and receivables are minimized, and accruals and payables are maximized. Under the restricted policy, NOWC is turned over more frequently, so each dollar of NOWC is forced to "work harder." A **moderate working capital policy** is between the two extremes.

Under conditions of certainty—when sales, costs, lead times, payment periods, and so on, are known for sure—all firms would hold only minimal levels of working capital. Any larger amounts would increase the need for external funding without a corresponding increase in profits, while any smaller holdings would involve late payments to suppliers along with lost sales due to inventory shortages and an overly restrictive credit policy.

However, the picture changes when uncertainty is introduced. Here the firm requires some minimum amount of cash and inventories based on expected payments, expected sales, expected order lead times, and so on, plus additional holdings, or *safety stocks*, which enable it to deal with departures from the expected values. Similarly, accounts receivable levels are determined by credit terms, and the tougher the credit terms, the lower the receivables for any given level of sales. With a restricted policy, the firm would hold minimal safety stocks of cash and inventories, and it would have a tight credit policy even though this meant running the risk of losing sales. A restricted, lean-and-mean working capital policy generally provides the highest expected return on this investment, but

⁴For more on the CCC, see James A. Gentry, R. Vaidyanathan, and Hei Wai Lee, "A Weighted Cash Conversion Cycle," *Financial Management*, Spring 1990, pp. 90–99.

it entails the greatest risk, while the reverse is true under a relaxed policy. The moderate policy falls in between the two extremes in terms of expected risk and return.

Recall that NOWC consists of cash, inventory, and accounts receivable, less accruals and accounts payable. Firms face a fundamental trade-off: Working capital is necessary to conduct business, and the greater the working capital, the smaller the danger of running short, hence the lower the firm's operating risk. However, holding working capital is costly—it reduces a firm's return on invested capital (ROIC), free cash flow, and value. The following sections discuss the individual components of NOWC.

SELF-TEST

Identify and explain three alternative working capital policies.

What are the principal components of net operating working capital?

What are the reasons for not wanting to hold too little working capital? For not wanting to hold too much?

22.3 Cash Management

Approximately 1.5% of the average industrial firm's assets are held in the form of cash, which is defined as demand deposits plus currency. Cash is often called a "nonearning asset." It is needed to pay for labor and raw materials, to buy fixed assets, to pay taxes, to service debt, to pay dividends, and so on. However, cash itself (and also most commercial checking accounts) earns no interest. Thus, the goal of the cash manager is to minimize the amount of cash the firm must hold for use in conducting its normal business activities, yet, at the same time, to have sufficient cash (1) to take trade discounts, (2) to maintain its credit rating, and (3) to meet unexpected cash needs. We begin our analysis with a discussion of the reasons for holding cash.

Reasons for Holding Cash

Firms hold cash for two primary reasons:

1. *Transactions.* Cash balances are necessary in business operations. Payments must be made in cash, and receipts are deposited in the cash account. Cash balances associated with routine payments and collections are known as **transactions balances**. Cash inflows and outflows are unpredictable, with the degree of predictability varying among firms and industries. Therefore, firms need to hold some cash in reserve for random, unforeseen fluctuations in inflows and outflows. These "safety stocks" are called **precautionary balances**, and the less predictable the firm's cash flows, the larger such balances should be.
2. *Compensation to banks for providing loans and services.* A bank makes money by lending out funds that have been deposited with it, so the larger its deposits, the better the bank's profit position. If a bank is providing services to a customer, it may require the customer to leave a minimum balance on deposit to help offset the costs of providing the services. Also, banks may require borrowers to hold deposits at the bank. Both types of deposits are called **compensating balances**. In a 1979 survey, 84.7% of responding companies reported that they were required to maintain compensating balances to help pay for

bank services.⁵ Only 13.3% reported paying direct fees for banking services. By 1996 those findings were reversed: Only 28% paid for bank services with compensating balances, while 83% paid direct fees.⁶ So, while the use of compensating balances to pay for services has declined, it is still a reason some companies hold so much cash.

In addition to holding cash for transactions, precautionary, and compensating balances, it is essential that the firm have sufficient cash to take **trade discounts**. Suppliers frequently offer customers discounts for early payment of bills. As we will see later in this chapter, the cost of not taking discounts is very high, so firms should have enough cash to permit payment of bills in time to take discounts.

Finally, firms often hold short-term investments in excess of the cash needed to support operations. We discuss short-term investments later in the chapter.

SELF-TEST

Why is cash management important?

What are the two primary motives for holding cash?

22.4 The Cash Budget

The **cash budget** shows the firm's projected cash inflows and outflows over some specified period. Generally, firms use a monthly cash budget forecasted over the next year, plus a more detailed daily or weekly cash budget for the coming month. The monthly cash budgets are used for planning purposes, and the daily or weekly budgets for actual cash control.

In Chapter 14, we saw that MicroDrive's projected sales were \$3,300 million, resulting in a net cash flow from operations of \$163 million. When all expenditures and financing flows were considered, its cash account was projected to increase by \$1 million. Does this mean that it will not have to worry about cash shortages during the year? To answer this question, we must construct the cash budget.

To simplify the example, we will only consider the cash budget for the last half of the year. Further, we will not list every cash flow but rather focus on the operating cash flows. Sales peak in September, and all sales are made on terms of 2/10, net 40, meaning that a 2% discount is allowed if payment is made within 10 days, and, if the discount is not taken, the full amount is due in 40 days. However, like most companies, MicroDrive finds that some of its customers delay payment up to 90 days. Experience has shown that payment on 20% of dollar sales is made during the month in which the sale is made—these are the discount sales. On 70% of sales, payment is made during the month immediately following the month of sale, and on 10% of sales, payment is made in the second month following the month of sale.

Costs average 70% of the sales prices of the finished products. Raw material purchases are generally made one month before the firm expects to sell the finished products, but MicroDrive's terms with its suppliers allow it to delay payments for

⁵See Lawrence J. Gitman, E. A. Moses, and I. T. White, "An Assessment of Corporate Cash Management Practices," *Financial Management*, Spring 1979, pp. 32–41.

⁶See Charles E. Maxwell, Lawrence J. Gitman, and Stephanie A. M. Smith, "Working Capital Management and Financial-Service Consumption Preferences of US and Foreign Firms: A Comparison of 1979 and 1996 Preferences," *Financial Practice and Education*, Fall/Winter 1998, pp. 46–52.

30 days. Accordingly, if July sales are forecasted at \$300 million, then purchases during June will amount to \$210 million, and this amount will actually be paid in July.

Such other cash expenditures as wages and lease payments are also built into the cash budget, and MicroDrive must make estimated tax payments of \$30 million on September 15 and \$20 million on December 15. Also, a \$100 million payment for a new plant must be made in October. Assuming that the **target cash balance** is \$10 million, and that it projects \$15 million to be on hand on July 1, what will MicroDrive's monthly cash surpluses or shortfalls be for the period from July to December?

The monthly cash flows are shown in Table 22-2. Section I of the table provides a worksheet for calculating both collections on sales and payments on purchases. Line 1 gives the sales forecast for the period from May through December. (May and June sales are necessary to determine collections for July and August.) Next, Lines 2 through 5 show cash collections. Line 2 shows that 20% of the sales during any given month are collected during that month. Customers who pay in the first month, however, take the discount, so the cash collected in the month of sale is reduced by 2%; for example, collections during July for the \$300 million of sales in that month will be 20% times sales times 1.0 minus the 2% discount = $(0.20)(\$300)(0.98) \approx \59 million. Line 3 shows the collections on the previous month's sales, or 70% of sales in the preceding month; for example, in July, 70% of the \$250 million June sales, or \$175 million, will be collected. Line 4 gives collections from sales 2 months earlier, or 10% of sales in that month; for example, the July collections for May sales are $(0.10)(\$200) = \20 million. The collections during each month are summed and shown on Line 5; thus, the July collections represent 20% of July sales (minus the discount) plus 70% of June sales plus 10% of May sales, or \$254 million in total.

Next, payments for purchases of raw materials are shown. July sales are forecasted at \$300 million, so MicroDrive will purchase \$210 million of materials in June (Line 6) and pay for these purchases in July (Line 7). Similarly, MicroDrive will purchase \$280 million of materials in July to meet August's forecasted sales of \$400 million.

With Section I completed, Section II can be constructed. Cash from collections is shown on Line 8. Lines 9 through 14 list payments made during each month, and these payments are summed on Line 15. The difference between cash receipts and cash payments (Line 8 minus Line 15) is the net cash gain or loss during the month. For July there is a net cash loss of \$11 million, as shown on Line 16.

In Section III, we first determine the cash balance MicroDrive would have at the start of each month, assuming no borrowing is done. This is shown on Line 17. MicroDrive would have \$15 million on hand on July 1. The beginning cash balance (Line 17) is then added to the net cash gain or loss during the month (Line 16) to obtain the cumulative cash that would be on hand if no financing were done (Line 18). At the end of July, MicroDrive forecasts a cumulative cash balance of \$4 million in the absence of borrowing.

The target cash balance, \$10 million, is then subtracted from the cumulative cash balance to determine the firm's borrowing requirements (shown in parentheses) or its surplus cash. Because MicroDrive expects to have cumulative cash, as shown on Line 18, of only \$4 million in July, it will have to borrow \$6 million to bring the cash account up to the target balance of \$10 million. Assuming that this amount is indeed borrowed, loans outstanding will total \$6 million at the end of July. (MicroDrive did not have any loans outstanding on July 1.) The cash surplus or required loan balance is given on Line 20; a positive value indicates a cash



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See **FM12 Ch 22 Tool Kit.xls** at the textbook's Web site for details.

Table 22-2

MicroDrive Inc.: Cash Budget (Millions of Dollars)

	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
I. COLLECTIONS AND PURCHASES WORKSHEET								
(1) Sales (gross) ^a	\$200	\$250	\$300	\$400	\$500	\$350	\$250	\$200
<i>Collections</i>								
(2) During month of sale:								
(0.2)(0.98)(month's sales)			59	78	98	69	49	39
(3) During first month after sale:								
0.7(previous month's sales)			175	210	280	350	245	175
(4) During second month after sale:								
0.1(sales 2 months ago)			<u>20</u>	<u>25</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>35</u>
(5) Total collections (2 + 3 + 4)			<u>\$254</u>	<u>\$313</u>	<u>\$408</u>	<u>\$459</u>	<u>\$344</u>	<u>\$249</u>
<i>Purchases</i>								
(6) 0.7(next month's sales)		\$210	\$280	\$350	\$245	\$175	\$140	
(7) Payments (prior month's purchases)			<u>\$210</u>	<u>\$280</u>	<u>\$350</u>	<u>\$245</u>	<u>\$175</u>	<u>\$140</u>
II. CASH GAIN OR LOSS FOR MONTH								
(8) Collections (from Section I)			<u>\$254</u>	<u>\$313</u>	<u>\$408</u>	<u>\$459</u>	<u>\$344</u>	<u>\$249</u>
(9) Payments for purchases (from Section I)			\$210	\$280	\$350	\$245	\$175	\$140
(10) Wages and salaries			30	40	50	40	30	30
(11) Lease payments			15	15	15	15	15	15
(12) Other expenses			10	15	20	15	10	10
(13) Taxes					30			20
(14) Payment for plant construction						100		
(15) Total payments			<u>\$265</u>	<u>\$350</u>	<u>\$465</u>	<u>\$415</u>	<u>\$230</u>	<u>\$215</u>
(16) Net cash gain (loss) during month (Line 8 – Line 15)			<u>(\$ 11)</u>	<u>(\$ 37)</u>	<u>(\$ 57)</u>	<u>\$ 44</u>	<u>\$114</u>	<u>\$ 34</u>
III. LOAN REQUIREMENT OR CASH SURPLUS								
(17) Cash at start of month if no borrowing is done ^b			<u>\$15</u>	<u>\$4</u>	<u>(\$33)</u>	<u>(\$90)</u>	<u>(\$46)</u>	<u>\$68</u>
(18) Cumulative cash: cash at start if no borrowing + gain or – loss (Line 16 + Line 17)			\$4	(\$33)	(\$90)	(\$46)	\$68	\$102
(19) Target cash balance			<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
(20) Cumulative surplus cash or loans outstanding to maintain \$10 target cash balance (Line 18 – Line 19) ^c			<u>(\$6)</u>	<u>(\$43)</u>	<u>(\$100)</u>	<u>(\$56)</u>	<u>\$58</u>	<u>\$92</u>

Notes:

^aAlthough the budget period is July through December, sales and purchases data for May and June are needed to determine collections and payments during July and August.

^bThe amount shown on Line 17 for July, the \$15 balance (in millions), is on hand initially. The values shown for each of the following months on Line 17 are equal to the cumulative cash as shown on Line 18 for the preceding month; for example, the \$4 shown on Line 17 for August is taken from Line 18 in the July column.

^cWhen the target cash balance of \$10 (Line 19) is deducted from the cumulative cash balance (Line 18), a resulting negative figure on Line 20 (shown in parentheses) represents a required loan, whereas a positive figure represents surplus cash. Loans are required from July through October, and surpluses are expected during November and December. Note also that firms can borrow or pay off loans on a daily basis, so the \$6 borrowed during July would be done on a daily basis, as needed, and during October the \$100 loan that existed at the beginning of the month would be reduced daily to the \$56 ending balance, which, in turn, would be completely paid off during November.

The CFO Cash Management Scorecard



Each year *CFO* magazine publishes a cash management scorecard prepared by REL Consultancy Group based on the 1,000 largest publicly traded U.S. companies. REL defines the return on capital employed (ROCE) as $EBIT / (ST\ debt + LT\ debt + equity)$. On the one hand, if a company holds more cash than needed to support its operations, its ROCE will be dragged down because cash earns a very low rate of return. On the other hand, if a company doesn't have enough cash, then it might experience financial distress if there is an unexpected downturn in business. How much cash is enough?

Although the optimum level of cash depends on a company's unique set of circumstances, REL defines an industry benchmark as the cash/sales ratio for the lowest quartile. The average benchmark cash/sales ratio is 5.5%. However, the average cash/sales ratio is 11.4%, which means that many firms have much more cash than indicated by the benchmark. REL estimates that if all firms could move to the benchmark, then the average ROCE would improve from 14.0% to 15.2%.

Potential improvements for some individual firms are even more pronounced. For example, Microsoft, with over \$42 billion in excess cash, could improve its ROCE from 12.1% to 27.4% by moving to its industry benchmark. Motorola, with almost \$7 billion in excess cash, could improve ROCE from 16.8% to 26.4%. Texas Instruments, with over \$3 billion in excess cash, could improve ROCE from 16.4% to 21.6%.

It's one thing to talk about reducing cash, but how can a company do it? A great relationship with its banks is one key to keeping low cash levels. Jim Hopwood, treasurer of Wickes, says, "We have a credit revolver if we ever need it." The same is true at Haverty Furniture, where CFO Dennis Fink says, "You don't have to worry about predicting short-term fluctuations in cash flow," if you have solid bank commitments.

Sources: Randy Myers, "Stuck on Yellow," *CFO*, October 2005, 81-90; and S. L. Mintz, "Lean Green Machine," *CFO*, July 2000, pp. 76-94. For updates, go to <http://www.cfo.com> and search for "cash management."

surplus, whereas a negative value indicates a loan requirement. Note that the surplus cash or loan requirement shown on Line 20 is a *cumulative amount*. MicroDrive must borrow \$6 million in July. Then, it has an additional cash shortfall during August of \$37 million as reported on Line 16, so its total loan requirement at the end of August is $\$6 + \$37 = \$43$ million, as reported on Line 20. MicroDrive's arrangement with the bank permits it to increase its outstanding loans on a daily basis, up to a prearranged maximum, just as you could increase the amount you owe on a credit card. MicroDrive will use any surplus funds it generates to pay off its loans, and because the loan can be paid down at any time, on a daily basis, the firm will never have both a cash surplus and an outstanding loan balance.

This same procedure is used in the following months. Sales will peak in September, accompanied by increased payments for purchases, wages, and other items. Receipts from sales will also go up, but the firm will still be left with a \$57 million net cash outflow during the month. The total loan requirement at the end of September will hit a peak of \$100 million, the cumulative cash plus the target cash balance. The \$100 million can also be found as the \$43 million needed at the end of August plus the \$57 million cash deficit for September.

Sales, purchases, and payments for past purchases will fall sharply in October, but collections will be the highest of any month because they will reflect the high September sales. As a result, MicroDrive will enjoy a healthy \$44 million net cash gain during October. This net gain can be used to pay off borrowings, so loans outstanding will decline by \$44 million, to \$56 million.

MicroDrive will have an even larger cash surplus in November, which will permit it to pay off all of its loans. In fact, the company is expected to have \$58 million in surplus cash by the month's end, and another cash surplus in December will swell the excess cash to \$92 million. With such a large amount of unneeded funds,

MicroDrive's treasurer will certainly want to invest in interest-bearing securities or to put the funds to use in some other way.

We intentionally kept this cash budget simple for illustrative purposes, but here are some potential refinements that you could easily incorporate: (1) Add dividend payments, stock issues, bond sales, interest income, and interest expenses. (2) Create a cash budget to determine weekly, or even daily, cash requirements. (3) Use simulation to estimate the probability distribution for the cash requirements. (4) Allow the target cash balance to vary over time, reflecting the seasonal nature of sales and operating activity.

SELF-TEST

What is the purpose of the cash budget?

What are the three major sections of a cash budget?

22.5 Cash Management Techniques

Most business is conducted by large firms, many of which operate regionally, nationally, or even globally. They collect cash from many sources and make payments from a number of different cities or even countries. For example, companies such as IBM, General Motors, and Hewlett-Packard have manufacturing plants all around the world, even more sales offices, and bank accounts in virtually every city where they do business. Their collection points follow sales patterns. Some disbursements are made from local offices, but most are made in the cities where manufacturing occurs, or else from the home office. Thus, a major corporation might have hundreds or even thousands of bank accounts, and since there is no reason to think that inflows and outflows will balance in each account, a system must be in place to transfer funds from where they come in to where they are needed, to arrange loans to cover net corporate shortfalls, and to invest net corporate surpluses without delay. We discuss the most commonly used techniques for accomplishing these tasks in the following sections.⁷

Synchronizing Cash Flow

If you as an individual were to receive income once a year, you would probably put it in the bank, draw down your account periodically, and have an average balance for the year equal to about half of your annual income. If instead you received income weekly and paid rent, tuition, and other charges on a weekly basis, and if you were confident of your forecasted inflows and outflows, then you could hold a small average cash balance.

Exactly the same situation holds for businesses—by improving their forecasts and by timing cash receipts to coincide with cash requirements, firms can hold their transactions balances to a minimum. Recognizing this, utility companies, oil companies, credit card companies, and so on, arrange to bill customers, and to pay their own bills, on regular “billing cycles” throughout the month. This **synchronization**

⁷For more information on cash management, see Bernell K. Stone and Tom W. Miller, “Daily Cash Forecasting with Multiplicative Models of Cash Flow Patterns,” *Financial Management*, Winter 1987, pp. 45–54; Bruce J. Summers, “Clearing and Payment Systems: The Role of the Central Bank,” *Federal Reserve Bulletin*, February 1991, pp. 81–91; John C. Wood and Dolores D. Smith, “Electronic Transfer of Government Benefits,” *Federal Reserve Bulletin*, April 1991, pp. 204–207; and Keith C. Brown and Scott L. Lummer, “A Reexamination of the Covered Call Option Strategy for Corporate Cash Management,” *Financial Management*, Summer 1986, pp. 13–17.

of cash flows provides cash when it is needed and thus enables firms to reduce the cash balances needed to support operations.

Speeding Up the Check-Clearing Process

When a customer writes and mails a check, the funds are not available to the receiving firm until the **check-clearing process** has been completed. First, the check must be delivered through the mail. Checks received from customers in distant cities are especially subject to mail delays.

When a customer's check is written upon one bank and a company deposits the check in its own bank, the company's bank must verify that the check is valid before the company can use those funds. Checks are generally cleared through the Federal Reserve System or through a clearinghouse set up by the banks in a particular city.⁸ Before 2004, this process sometimes took 2 to 5 days. But with the passage of a bill in 2004 known as "Check 21," banks can exchange digital images of checks. This means that most checks now clear in a day.

Using Float

Float is defined as the difference between the balance shown in a firm's (or individual's) checkbook and the balance on the bank's records. Suppose a firm writes, on average, checks in the amount of \$5,000 each day, and it takes 6 days for these checks to clear and be deducted from the firm's bank account. This will cause the firm's own checkbook to show a balance \$30,000 smaller than the balance on the bank's records; this difference is called **disbursement float**. Now suppose the firm also receives checks in the amount of \$5,000 daily, but it loses 4 days while they are being deposited and cleared. This will result in \$20,000 of **collections float**. In total, the firm's **net float**—the difference between the \$30,000 positive disbursement float and the \$20,000 negative collections float—will be \$10,000.

Delays that cause float arise because it takes time for checks (1) to travel through the mail (mail float), (2) to be processed by the receiving firm (processing float), and (3) to clear through the banking system (clearing, or availability, float). Basically, the size of a firm's net float is a function of its ability to speed up collections on checks it receives and to slow down collections on checks it writes. Efficient firms go to great lengths to speed up the processing of incoming checks, thus putting the funds to work faster, and they try to stretch their own payments out as long as possible, sometimes by disbursing checks from banks in remote locations.

Speeding Up Receipts

Two major techniques are now used both to speed collections and to get funds where they are needed: (1) lockbox plans and (2) payment by wire or automatic debit.

Lockboxes A **lockbox plan** is one of the oldest cash management tools. In a lockbox system, incoming checks are sent to post office boxes rather than to corporate

⁸For example, suppose a check for \$100 is written on Bank A and deposited at Bank B. Bank B will usually contact either the Federal Reserve System or a clearinghouse to which both banks belong. The Fed or the clearinghouse will then verify with Bank A that the check is valid and that the account has sufficient funds to cover the check. Bank A's account with the Fed or the clearinghouse is then reduced by \$100, and Bank B's account is increased by \$100. Of course, if the check is deposited in the same bank on which it was drawn, that bank merely transfers funds by bookkeeping entries from one depositor to another.

headquarters. For example, a firm headquartered in New York City might have its West Coast customers send their payments to a box in San Francisco, its customers in the Southwest send their checks to Dallas, and so on, rather than having all checks sent to New York City. Several times a day a local bank will collect the contents of the lockbox and deposit the checks into the company's local account. In fact, some banks even have their lockbox operation located in the same facility as the post office. The bank then provides the firm with a daily record of the receipts collected, usually via an electronic data transmission system in a format that permits online updating of the firm's accounts receivable records.

A lockbox system reduces the time required for a firm to receive incoming checks, to deposit them, and to get them cleared through the banking system so the funds are available for use. Lockbox services can accelerate the availability of funds by 2 to 5 days over the "regular" system.

Payment by Wire or Automatic Debit Firms are increasingly demanding payments of larger bills by wire, or even by automatic electronic debits. Under an electronic debit system, funds are automatically deducted from one account and added to another. This is, of course, the ultimate in a speeded-up collection process, and computer technology is making such a process increasingly feasible and efficient, even for retail transactions.

SELF-TEST

What is float? How do firms use float to increase cash management efficiency?

What are some methods firms can use to accelerate receipts?

22.6 Inventory

Inventory management techniques are covered in depth in production management courses. Still, since financial managers have a responsibility both for raising the capital needed to carry inventory and for the firm's overall profitability, we need to cover the financial aspects of inventory management here.

The twin goals of inventory management are (1) to ensure that the inventories needed to sustain operations are available, but (2) to hold the costs of ordering and carrying inventories to the lowest possible level. While analyzing improvements in the cash conversion cycle, we identified some of the cash flows associated with a reduction in inventory. In addition to the points made earlier, lower inventory levels reduce costs due to storage and handling, insurance, property taxes, and spoilage or obsolescence.

Consider Trane Corporation, which makes air conditioners, and recently adopted just-in-time inventory procedures. In the past, Trane produced parts on a steady basis, stored them as inventory, and had them ready whenever the company received an order for a batch of air conditioners. However, the company reached the point where its inventory covered an area equal to three football fields, and it still sometimes took as long as 15 days to fill an order. To make matters worse, occasionally some of the necessary components simply could not be located, while in other instances the components were located but found to have been damaged from long storage.

Then Trane adopted a new inventory policy—it began producing components only after an order is received, and then sending the parts directly from the machines that make them to the final assembly line. The net effect: Inventories fell nearly 40% even as sales increased by 30%.

Such improvements in inventory management can free up considerable amounts of cash. For example, suppose a company has sales of \$120 million and an inventory turnover ratio of 3. This means the company has an inventory level of

$$\begin{aligned}\text{Inventory} &= \text{Sales}/(\text{Inventory turnover ratio}) \\ &= \$120/3 = \$40 \text{ million.}\end{aligned}$$

If the company can improve its inventory turnover ratio to 4, then its inventory will fall to

$$\text{Inventory} = \$120/4 = \$30 \text{ million.}$$

This \$10 million reduction in inventory boosts free cash flow by \$10 million.

However, there are costs associated with holding too little inventory, and these costs can be severe. Generally, if a business carries small inventories, it must reorder frequently. This increases ordering costs. Even more important, firms can miss out on profitable sales and also suffer a loss of goodwill that can lead to lower future sales if they experience stockouts. So, it is important to have enough inventory on hand to meet customer demands.⁹

SELF-TEST

What are some costs associated with high inventories? With low inventories?

A company has \$20 million in sales and an inventory turnover ratio of 2.0. If it can reduce its inventory and improve its inventory turnover ratio to 2.5 with no loss in sales, by how much will FCF increase? (\$2 million)

22.7 Receivables Management

Firms would, in general, rather sell for cash than on credit, but competitive pressures force most firms to offer credit. Thus, goods are shipped, inventories are reduced, and an **account receivable** is created.¹⁰ Eventually, the customer will pay the account, at which time (1) the firm will receive cash and (2) its receivables will decline. Carrying receivables has both direct and indirect costs, but it also has an important benefit—increased sales.

Receivables management begins with the credit policy, but a monitoring system is also important. Corrective action is often needed, and the only way to know whether the situation is getting out of hand is with a good receivables control system.¹¹

⁹For additional insights into the problems of inventory management, see Richard A. Followill, Michael Schellenger, and Patrick H. Marchard, "Economic Order Quantities, Volume Discounts, and Wealth Maximization," *The Financial Review*, February 1990, pp. 143–152.

¹⁰Whenever goods are sold on credit, two accounts are created—an asset item entitled *accounts receivable* appears on the books of the selling firm, and a liability item called *accounts payable* appears on the books of the purchaser. At this point, we are analyzing the transaction from the viewpoint of the seller, so we are concentrating on the variables under its control, in this case, the receivables. We examine the transaction from the viewpoint of the purchaser later in this chapter, where we discuss accounts payable as a source of funds and consider their cost.

¹¹For more on credit policy and receivables management, see George W. Gallinger and A. James Ifflander, "Monitoring Accounts Receivable Using Variance Analysis," *Financial Management*, Winter 1986, pp. 69–76; Shehzad L. Mian and Clifford W. Smith, "Extending Trade Credit and Financing Receivables," *Journal of Applied Corporate Finance*, Spring 1994, pp. 75–84; and Paul D. Adams, Steve B. Wyatt, and Yong H. Kim, "A Contingent Claims Analysis of Trade Credit," *Financial Management*, Autumn 1992, pp. 104–112.

Supply Chain Management



Herman Miller Inc. manufactures a wide variety of office furniture, and a typical order from a single customer might require work at five different plants. Each plant uses components from different suppliers, and each plant works on orders for many customers. Imagine all the coordination that is required. The sales force generates the order, the purchasing department orders components from suppliers, and the suppliers must order materials from their own suppliers. Then, the suppliers ship the components to Herman Miller, the factory builds the product, the different products are gathered together to complete the order, and then the order is shipped to the customer. If one part of that process malfunctions, then the order will be delayed, inventory will pile up, extra costs to expedite the order will be incurred, and the customer's goodwill will be damaged, which will hurt future sales growth.

To prevent such consequences, many companies are turning to a process called supply chain management (SCM). The key element in SCM is sharing information all the way from the point of sale at the product's retailer to the suppliers, and even back to the suppliers' suppliers. SCM requires special software, but even more important, it requires cooperation among the different companies and departments

in the supply chain. This new culture of open communication is often difficult for many companies—they are reluctant to divulge operating information. For example, EMC Corp., a manufacturer of data storage systems, has become deeply involved in the design processes and financial controls of its key suppliers. Many of EMC's suppliers were initially wary of these new relationships. However, SCM has been a win-win situation, with increases in value for EMC and its suppliers.

The same is true at many other companies. After implementing SCM, Herman Miller was able to reduce its days of inventory on hand by a week and to cut two weeks off of delivery times to customers. Herman Miller was also able to operate its plants at a 20% higher volume without additional capital expenditures. As another example, Heineken USA can now get beer from its breweries to its customers' shelves in less than 6 weeks, compared with 10 to 12 weeks before implementing SCM. As these and other companies have found, SCM increases free cash flows, and that leads to higher stock prices.

Sources: Elaine L. Appleton, "Supply Chain Brain," *CFO*, July 1997, pp. 51–54; and Kris Frieswick, "Up Close and Virtual," *CFO*, April 1998, pp. 87–91.

Credit Policy

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

1. *Credit period*, which is the length of time buyers are given to pay for their purchases. For example, credit terms of "2/10, net 30" indicate that buyers may take up to 30 days to pay.
2. *Discounts* given for early payment, including the discount percentage and how rapidly payment must be made to qualify for the discount. The credit terms "2/10, net 30" allow buyers to take a 2% discount if they pay within 10 days. Otherwise, they must pay the full amount within 30 days.
3. *Credit standards*, which refer to the required financial strength of acceptable credit customers. Lower credit standards boost sales, but also increase bad debts.
4. *Collection policy*, which is measured by its toughness or laxity in attempting to collect on slow-paying accounts. A tough policy may speed up collections, but it might also anger customers, causing them to take their business elsewhere.

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

The Accumulation of Receivables

The total amount of accounts receivable outstanding at any given time is determined by two factors: (1) the volume of credit sales and (2) the average length of time between sales and collections. For example, suppose Boston Lumber Company (BLC), a wholesale distributor of lumber products, opens a warehouse on January 1 and, starting the first day, makes sales of \$1,000 each day. For simplicity, we assume that all sales are on credit, and customers are given 10 days to pay. At the end of the first day, accounts receivable will be \$1,000; they will rise to \$2,000 by the end of the second day; and by January 10, they will have risen to $10(\$1,000) = \$10,000$. On January 11, another \$1,000 will be added to receivables, but payments for sales made on January 1 will reduce receivables by \$1,000, so total accounts receivable will remain constant at \$10,000. In general, once the firm's operations have stabilized, this situation will exist:

$$\begin{aligned} \text{Accounts receivable} &= \text{Credit sales per day} \times \text{Length of collection period} && (22-5) \\ &= \$1,000 \times 10 \text{ days} = \$10,000. \end{aligned}$$

If either credit sales or the collection period changes, such changes will be reflected in accounts receivable.

Monitoring the Receivables Position

Investors—both stockholders and bank loan officers—should pay close attention to accounts receivable management, for, as we shall see, one can be misled by reported financial statements and later suffer serious losses on an investment.

When a credit sale is made, the following events occur: (1) Inventories are reduced by the cost of goods sold, (2) accounts receivable are increased by the sales price, and (3) the difference is profit, which is added to retained earnings. If the sale is for cash, then the cash from the sale has actually been received by the firm, but if the sale is on credit, the firm will not receive the cash from the sale unless and until the account is collected. Firms have been known to encourage "sales" to very weak customers in order to report high profits. This could boost the firm's stock price, at least until credit losses begin to lower earnings, at which time the stock price will fall. Analyses along the lines suggested in the following sections will detect any such questionable practice, as well as any unconscious deterioration in the quality of accounts receivable. Such early detection helps both investors and bankers avoid losses.

Days Sales Outstanding (DSO) Suppose Super Sets Inc., a television manufacturer, sells 200,000 television sets a year at a price of \$198 each. Further, assume that all sales are on credit with the following terms: If payment is made within 10 days, customers will receive a 2% discount; otherwise the full amount is due within

30 days. Finally, assume that 70% of the customers take discounts and pay on Day 10, while the other 30% pay on Day 30.

Super Sets's **days sales outstanding (DSO)**, sometimes called the *average collection period (ACP)*, is 16 days:

$$\text{DSO} = \text{ACP} = 0.7(10 \text{ days}) + 0.3(30 \text{ days}) = 16 \text{ days.}$$

Super Sets's *average daily sales (ADS)* is \$108,493:

$$\begin{aligned} \text{ADS} &= \frac{\text{Annual sales}}{365} = \frac{(\text{Units sold})(\text{Sales price})}{365} && \text{(22-6)} \\ &= \frac{200,000(\$198)}{365} = \frac{\$39,600,000}{365} = \$108,493. \end{aligned}$$

Super Sets's accounts receivable, assuming a constant, uniform rate of sales throughout the year, will at any point in time be \$1,735,888:

$$\begin{aligned} \text{Receivables} &= (\text{ADS})(\text{DSO}) && \text{(22-7)} \\ &= (\$108,493)(16) = \$1,735,888. \end{aligned}$$

Note also that its DSO, or average collection period, is a measure of the average length of time it takes Super Sets's customers to pay off their credit purchases, and the DSO is often compared with an industry average DSO. For example, if all television manufacturers sell on the same credit terms, and if the industry average DSO is 25 days versus Super Sets's 16 days, then Super Sets either has a higher percentage of discount customers or else its credit department is exceptionally good at ensuring prompt payment.

Finally, note that if you know both the annual sales and the receivables balance, you can calculate DSO as follows:

$$\text{DSO} = \frac{\text{Receivables}}{\text{Sales per day}} = \frac{\$1,735,888}{\$108,493} = 16 \text{ days.}$$

The DSO can also be compared with the firm's own credit terms. For example, suppose Super Sets's DSO had been averaging 35 days. With a 35-day DSO, some customers would obviously be taking more than 30 days to pay their bills. In fact, if many customers were paying within 10 days to take advantage of the discount, the others must, on average, be taking much longer than 35 days. One way to check this possibility is to use an aging schedule as described in the next section.

Aging Schedules An **aging schedule** breaks down a firm's receivables by age of account. Table 22-3 contains the December 31, 2006, aging schedules of two television manufacturers, Super Sets and Wonder Vision. Both firms offer the same credit terms, and both show the same total receivables. However, Super Sets's aging schedule indicates that all of its customers pay on time—70% pay on Day 10 while 30% pay on Day 30. On the other hand, Wonder Vision's schedule, which is more typical, shows that many of its customers are not abiding by its credit

Table 22-3

Aging Schedules

Age of Account (Days)	Super Sets		Wonder Vision	
	Value of Account	Percentage of Total Value	Value of Account	Percentage of Total Value
0–10	\$1,215,122	70%	\$ 815,867	47%
11–30	520,766	30	451,331	26
31–45	0	0	260,383	15
46–60	0	0	173,589	10
Over 60	0	0	34,718	2
Total receivables	<u>\$1,735,888</u>	<u>100%</u>	<u>\$1,735,888</u>	<u>100%</u>

terms—some 27% of its receivables are more than 30 days old, even though Wonder Vision’s credit terms call for full payment by Day 30.

Aging schedules cannot be constructed from the type of summary data reported in financial statements; they must be developed from the firm’s accounts receivable ledger. However, well-run firms have computerized their accounts receivable records, so it is easy to determine the age of each invoice, to sort electronically by age categories, and thus to generate an aging schedule.

Management should constantly monitor both the DSO and the aging schedule to detect trends, to see how the firm’s collection experience compares with its credit terms, and to see how effectively the credit department is operating in comparison with other firms in the industry. If the DSO starts to lengthen, or if the aging schedule begins to show an increasing percentage of past-due accounts, then the firm’s credit policy may need to be tightened.

Although a change in the DSO or the aging schedule should signal the firm to investigate its credit policy, a deterioration in either of these measures does not necessarily indicate that the firm’s credit policy has weakened. In fact, if a firm experiences sharp seasonal variations, or if it is growing rapidly, then both the aging schedule and the DSO may be distorted. To see this point, note that the DSO is calculated as follows:

$$\text{DSO} = \frac{\text{Accounts receivable}}{\text{Sales}/365}.$$

Since receivables at a given point in time reflect sales in the last month or so, but sales as shown in the denominator of the equation are for the last 12 months, a seasonal increase in sales will increase the numerator more than the denominator, hence will raise the DSO. This will occur even if customers are still paying exactly as before. Similar problems arise with the aging schedule if sales fluctuate widely. Therefore, a change in either the DSO or the aging schedule should be taken as a signal to investigate further, but not necessarily as a sign that the firm’s credit policy has weakened.

SELF-TEST

Explain how a new firm’s receivables balance is built up over time.

Define days sales outstanding (DSO). What can be learned from it? How is it affected by sales fluctuations?

What is an aging schedule? What can be learned from it? How is it affected by sales fluctuations?

A company has annual sales of \$730 million dollars. If its DSO is 35, what is its average accounts receivables? (\$70 million)

22.8 Accruals and Accounts Payable (Trade Credit)

Recall that net operating working capital is equal to operating current assets minus operating current liabilities. The previous sections discussed the management of operating current assets (cash, inventory, and accounts receivable), and the following sections discuss the two major types of operating current liabilities—accruals and accounts payable.¹²

Accruals

Firms generally pay employees on a weekly, biweekly, or monthly basis, so the balance sheet will typically show some accrued wages. Similarly, the firm's own estimated income taxes, Social Security and income taxes withheld from employee payrolls, and sales taxes collected are generally paid on a weekly, monthly, or quarterly basis; hence the balance sheet will typically show some accrued taxes along with accrued wages.

These **accruals** increase automatically, or spontaneously, as a firm's operations expand. However, a firm cannot ordinarily control its accruals: The timing of wage payments is set by economic forces and industry custom, while tax payment dates are established by law. Thus, firms use all the accruals they can, but they have little control over the levels of these accounts.

Accounts Payable (Trade Credit)

Firms generally make purchases from other firms on credit, recording the debt as an *account payable*. Accounts payable, or **trade credit**, is the largest single category of operating current liabilities, representing about 40% of the current liabilities of the average nonfinancial corporation. The percentage is somewhat larger for smaller firms: Because small companies often do not qualify for financing from other sources, they rely especially heavily on trade credit.

Trade credit is a "spontaneous" source of financing in the sense that it arises from ordinary business transactions. For example, suppose a firm makes average purchases of \$2,000 a day on terms of net 30, meaning that it must pay for goods 30 days after the invoice date. On average, it will owe 30 times \$2,000, or \$60,000, to its suppliers. If its sales, and consequently its purchases, were to double, then its accounts payable would also double, to \$120,000. So, simply by growing, the firm would spontaneously generate an additional \$60,000 of financing. Similarly, if the terms under which it bought were extended from 30 to 40 days, its accounts payable would expand from \$60,000 to \$80,000. Thus, lengthening the credit period, as well as expanding sales and purchases, generates additional financing.

The Cost of Trade Credit

Firms that sell on credit have a *credit policy* that includes certain *terms of credit*. For example, Microchip Electronics sells on terms of 2/10, net 30, meaning that it gives its customers a 2% discount if they pay within 10 days of the invoice date, but the full invoice amount is due and payable within 30 days if the discount is not taken.

¹²For more on accounts payable management, see James A. Gentry and Jesus M. De La Garza, "Monitoring Accounts Payables," *Financial Review*, November 1990, pp. 559–576.

Note that the true price of Microchip's products is the net price, or 0.98 times the list price, because any customer can purchase an item at that price as long as the customer pays within 10 days. Now consider Personal Computer Company (PCC), which buys its memory chips from Microchip. One commonly used memory chip is listed at \$100, so the "true" price to PCC is \$98. Now if PCC wants an additional 20 days of credit beyond the 10-day discount period, it must incur a finance charge of \$2 per chip for that credit. Thus, the \$100 list price consists of two components:

$$\text{List price} = \$98 \text{ true price} + \$2 \text{ finance charge.}$$

The question PCC must ask before it turns down the discount to obtain the additional 20 days of credit from Microchip is this: Could we obtain credit under better terms from some other lender, say, a bank? In other words, could 20 days of credit be obtained for less than \$2 per chip?

PCC buys an average of \$11,923,333 of memory chips from Microchip each year at the net, or true, price. This amounts to $\$11,923,333/365 = \$32,666.67$ per day. For simplicity, assume that Microchip is PCC's only supplier. If PCC decides not to take the additional trade credit—that is, if it pays on the 10th day and takes the discount—its payables will average $10(\$32,666.67) = \$326,667$. Thus, PCC will be receiving \$326,667 of credit from Microchip.

Now suppose PCC decides to take the additional 20 days credit and thus must pay the finance charge. Since PCC will now pay on the 30th day, its accounts payable will increase to $30(\$32,666.67) = \$980,000$.¹³ Microchip will now be supplying PCC with an additional $\$980,000 - \$326,667 = \$653,333$ of credit, which PCC could use to build up its cash account, to pay off debt, to expand inventories, or even to extend credit to its own customers, hence increasing its own accounts receivable.

The additional trade credit offered by Microchip has a cost—PCC must pay a finance charge equal to the 2% discount it is forgoing. PCC buys \$11,923,333 of chips at the true price, and the added finance charges increase the total cost to $\$11,923,333/0.98 = \$12,166,666$. Therefore, the annual financing cost is $\$12,166,666 - \$11,923,333 = \$243,333$. Dividing the \$243,333 financing cost by the \$653,333 of additional credit, we find the nominal annual cost rate of the additional trade credit to be 37.2%:

$$\text{Nominal annual costs} = \frac{\$243,333}{\$653,333} = 37.2\%.$$

If PCC can borrow from its bank (or from other sources) at an interest rate less than 37.2%, it should take discounts and forgo the additional trade credit.

The following equation can be used to calculate the nominal cost, on an annual basis, of not taking discounts, illustrated with terms of 2/10, net 30:

$$\text{Nominal annual cost} = \frac{\text{Discount percent}}{100 - \text{Discount percent}} \times \frac{365}{\text{Days credit is outstanding} - \text{Discount period}} \quad (22-8)$$

$$= \frac{2}{98} \times \frac{365}{20} = 2.04\% \times 18.25 = 37.2\%.$$

¹³A question arises here: Should accounts payable reflect gross purchases or purchases net of discounts? Generally accepted accounting principles permit either treatment if the difference is not material, but if the discount is material, then the transaction must be recorded net of discounts, or at "true" prices. Then, the higher payment that results from not taking discounts is reported as an additional expense called "discounts lost." Thus, we show accounts payable net of discounts even if the company does not expect to take discounts.

The numerator of the first term, Discount percent, is the cost per dollar of credit, while the denominator in this term, $100 - \text{Discount percent}$, represents the funds made available by not taking the discount. Thus, the first term, 2.04%, is the cost per period for the trade credit. The denominator of the second term is the number of days of extra credit obtained by not taking the discount, so the entire second term shows how many times each year the cost is incurred, 18.25 times in this example.

The nominal annual cost formula does not take account of compounding, and in effective annual interest terms, the cost of trade credit is even higher. The discount amounts to interest, and with terms of 2/10, net 30, the firm gains use of the funds for $30 - 10 = 20$ days, so there are $365/20 = 18.25$ “interest periods” per year. Remember that the first term in Equation 22-8, $(\text{Discount percent})/(100 - \text{Discount percent}) = 0.02/0.98 = 0.0204$, is the periodic interest rate. This rate is paid 18.25 times each year, so the effective annual cost of trade credit is

$$\text{Effective annual rate} = (1.0204)^{18.25} - 1.0 = 1.4459 - 1.0 = 44.6\%.$$

Thus, the 37.2% nominal cost calculated with Equation 22-8 understates the true cost.

Note, however, that the cost of trade credit can be reduced by paying late. Thus, if PCC could get away with paying in 60 days rather than in the specified 30 days, then the effective credit period would become $60 - 10 = 50$ days, the number of times the discount would be lost would fall to $365/50 = 7.3$, and the nominal cost would drop from 37.2% to $2.04\% \times 7.3 = 14.9\%$. The effective annual rate would drop from 44.6% to 15.9%:

$$\text{Effective annual rate} = (1.0204)^{7.3} - 1.0 = 1.1589 - 1.0 = 15.9\%.$$

In periods of excess capacity, firms may be able to get away with deliberately paying late, or **stretching accounts payable**. However, they will also suffer a variety of problems associated with being branded a “slow payer.” These problems are discussed later in the chapter.

The costs of the additional trade credit from forgoing discounts under some other purchase terms are shown below:

Credit Terms	Cost of Additional Credit If the Cash Discount Is Not Taken	
	Nominal Cost	Effective Cost
1/10, net 20	36.9%	44.3%
1/10, net 30	18.4	20.1
2/10, net 20	74.5	109.0
3/15, net 45	37.6	44.9

As these figures show, the cost of not taking discounts can be substantial. Incidentally, throughout the chapter, we assume that payments are made either on the *last day* for taking discounts or on the *last day* of the credit period, unless otherwise noted. It would be foolish to pay, say, on the 5th day or on the 20th day if the credit terms were 2/10, net 30.¹⁴

¹⁴A financial calculator can also be used to determine the cost of trade credit. If the terms of credit are 2/10, net 30, this implies that for every \$100 of goods purchased at the full list price, the customer has the choice of paying the full amount in 30 days or else paying \$98 in 10 days. If a customer decides not to take the discount, then it is in effect borrowing \$98, the amount it would otherwise have to pay, from Day 11 to Day 30, or for 20 days. It will then have to pay \$100, which is the \$98 loan plus a \$2 financing charge, at the end of the 20-day loan period. To calculate the interest rate, enter $N = 1$, $PV = 98$, $PMT = 0$, $FV = -100$, and then press I to obtain 2.04%. This is the rate for 20 days. To calculate the effective annual interest rate on a 365-day basis, enter $N = 20/365 = 0.05479$, $PV = 98$, $PMT = 0$, $FV = -100$, and then press I/YR to obtain 44.6%. The $20/365 = 0.05479$ is the fraction of a year the “loan” is outstanding, and the 44.6% is the annualized cost of not taking discounts.

On the basis of the preceding discussion, trade credit can be divided into two components: (1) **free trade credit**, which involves credit received during the discount period, and (2) **costly trade credit**, which involves credit in excess of the free trade credit and whose cost is an implicit one based on the forgone discounts. *Firms should always use the free component, but they should use the costly component only after analyzing the cost of this capital to make sure that it is less than the cost of funds that could be obtained from other sources.* Under the terms of trade found in most industries, the costly component is relatively expensive, so stronger firms will avoid using it.

SELF-TEST

What are accruals? How much control do managers have over accruals?

What is trade credit?

What is the difference between free trade credit and costly trade credit?

How does the cost of costly trade credit generally compare with the cost of short-term bank loans?

A company has credit terms of 2/12, net 28. What is the nominal annual cost of trade credit? The effective annual cost? (46.6%; 58.5%)

22.9 Alternative Short-Term Financing Policies

Up until this point we have focused on the management of net operating working capital. We now turn our attention to decisions involving short-term investments and short-term financing.

Most businesses experience seasonal and/or cyclical fluctuations. For example, construction firms have peaks in the spring and summer, retailers peak around Christmas, and the manufacturers who supply both construction companies and retailers follow similar patterns. Similarly, virtually all businesses must build up net operating working capital (NOWC) when the economy is strong, but they then sell off inventories and reduce receivables when the economy slacks off. Still, NOWC rarely drops to zero—companies have some **permanent NOWC**, which is the NOWC on hand at the low point of the cycle. Then, as sales increase during the upswing, NOWC must be increased, and the additional NOWC is defined as **temporary NOWC**. The manner in which the permanent and temporary NOWC are financed is called the firm's *short-term financing policy*.

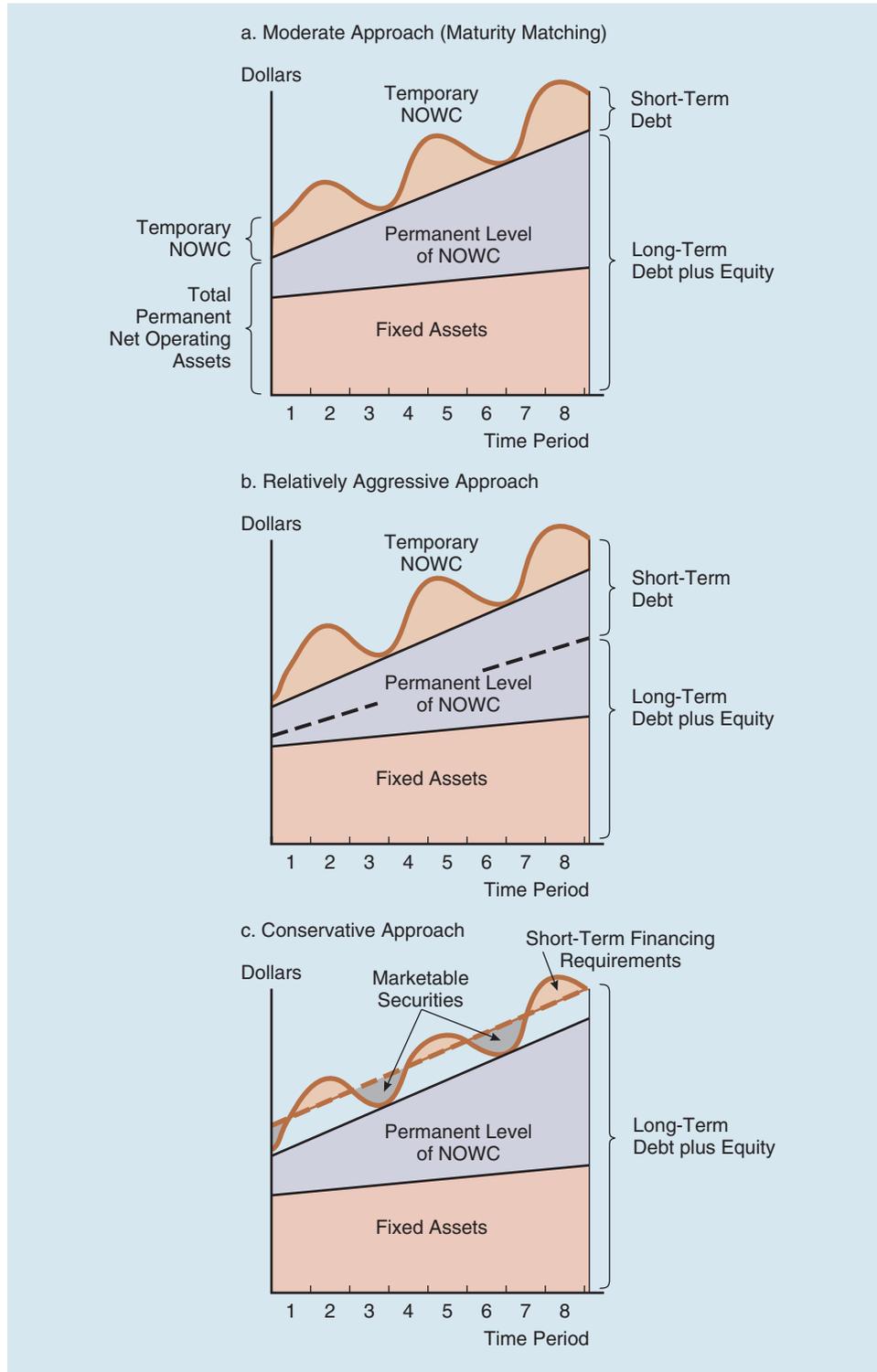
Maturity Matching, or “Self-Liquidating,” Approach

The **maturity matching**, or “**self-liquidating**,” approach calls for matching asset and liability maturities as shown in Panel a of Figure 22-2. This strategy minimizes the risk that the firm will be unable to pay off its maturing obligations. To illustrate, suppose a company borrows on a 1-year basis and uses the funds obtained to build and equip a plant. Cash flows from the plant (profits plus depreciation) would not be sufficient to pay off the loan at the end of only 1 year, so the loan would have to be renewed. If for some reason the lender refused to renew the loan, then the company would have problems. Had the plant been financed with long-term debt, however, the required loan payments would have been better matched with cash flows from profits and depreciation, and the problem of renewal would not have arisen.

At the limit, a firm could attempt to match exactly the maturity structure of its assets and liabilities. Inventory expected to be sold in 30 days could be financed with a 30-day bank loan; a machine expected to last for 5 years could be financed

Figure 22-2

Alternative Short-Term Financing Policies



with a 5-year loan; a 20-year building could be financed with a 20-year mortgage bond; and so forth. In practice, firms don't actually finance each specific asset with a type of capital that has a maturity equal to the asset's life. However, academic studies do show that most firms tend to finance short-term assets from short-term sources and long-term assets from long-term sources.¹⁵

Aggressive Approach

Panel b of Figure 22-2 illustrates the situation for a relatively aggressive firm that finances all of its fixed assets with long-term capital and part of its permanent NOWC with short-term debt. Note that we used the term "relatively" in the title for Panel b because there can be different *degrees* of aggressiveness. For example, the dashed line in Panel b could have been drawn *below* the line designating fixed assets, indicating that all of the permanent NOWC and part of the fixed assets were financed with short-term credit; this would be a highly aggressive, extremely non-conservative position, and the firm would be very much subject to dangers from rising interest rates as well as to loan renewal problems. However, short-term debt is often cheaper than long-term debt, and some firms are willing to sacrifice safety for the chance of higher profits.

Conservative Approach

Panel c of Figure 22-2 has the dashed line *above* the line designating permanent NOWC, indicating that long-term sources are being used to finance all permanent operating asset requirements and also to meet some of the seasonal needs. In this situation, the firm uses a small amount of short-term debt to meet its peak requirements, but it also meets a part of its seasonal needs by "storing liquidity" in the form of marketable securities. The humps above the dashed line represent short-term financing, while the troughs below the dashed line represent short-term investing. Panel c represents a very safe, conservative current asset financing policy.

SELF-TEST

What is meant by the term "permanent NOWC"?

What is meant by the term "temporary NOWC"?

What are three alternative short-term financing policies? Is one best?

22.10 Short-Term Investments: Marketable Securities

Realistically, the management of cash and marketable securities cannot be separated—management of one implies management of the other. In the first part of the chapter, we focused on cash management. Now, we turn to **marketable securities**.

Marketable securities typically provide much lower yields than operating assets. For example, recently DaimlerChrysler held approximately \$5.8 billion in short-term marketable securities, in addition to the \$9.1 billion it held in cash.



For updates, see <http://finance.yahoo.com>, get a quote for DCX, and take a look at its balance sheets.

¹⁵For example, see William Beranek, Christopher Cornwell, and Sunho Choi, "External Financing, Liquidity, and Capital Expenditures," *Journal of Financial Research*, Summer 1995, pp. 207–222.

Why would a company such as DaimlerChrysler have such large holdings of low-yielding assets?

In many cases, companies hold marketable securities for the same reasons they hold cash. Although these securities are not the same as cash, in most cases they can be converted to cash on very short notice (often just a few minutes) with a single telephone call. Moreover, while cash and most commercial checking accounts yield nothing, marketable securities provide at least a modest return. For this reason, many firms hold at least some marketable securities in lieu of larger cash balances, liquidating part of the portfolio to increase the cash account when cash outflows exceed inflows. In such situations, the marketable securities could be used as a substitute for transactions balances or for precautionary balances. In most cases, the securities are held primarily for precautionary purposes—most firms prefer to rely on bank credit to make temporary transactions, but they may still hold some liquid assets to guard against a possible shortage of bank credit during difficult times.

There are both benefits and costs associated with holding marketable securities. The benefits are twofold: (1) the firm reduces risk and transactions costs because it won't have to issue securities or borrow as frequently to raise cash; and (2) it will have ready cash to take advantage of bargain purchases or growth opportunities. Funds held for the second reason are called **speculative balances**. The primary disadvantage is that the after-tax return on short-term securities is very low. Thus, firms face a trade-off between benefits and costs.

Recent research supports this trade-off hypothesis as an explanation for firms' cash holdings.¹⁶ Firms with high growth opportunities suffer the most if they don't have ready cash to quickly take advantage of an opportunity, and the data show that these firms do hold relatively high levels of marketable securities. Firms with volatile cash flows are the ones most likely to run low on cash, so they tend to hold high levels of cash. In contrast, cash holdings are less important to large firms with high credit ratings, because they have quick and inexpensive access to capital markets. As expected, such firms hold relatively low levels of cash. Of course, there will always be outliers such as Microsoft, which is large, strong, and cash-rich, but volatile firms with good growth opportunities are still the ones with the most marketable securities, on average.

SELF-TEST Why might a company hold low-yielding marketable securities when it could earn a much higher return on operating assets?

22.11 Short-Term Financing

The three possible short-term financing policies described earlier were distinguished by the relative amounts of short-term debt used under each policy. The aggressive policy called for the greatest use of short-term debt, while the conservative policy called for the least. Maturity matching fell in between. Although short-term credit is generally riskier than long-term credit, using short-term funds does have some significant advantages. The pros and cons of short-term financing are considered in this section.

¹⁶See Tim Opler, Lee Pinkowitz, René Stulz, and Rohan Williamson, "The Determinants and Implications of Corporate Cash Holdings," *Journal of Financial Economics*, 1999, pp. 3–46. For additional insights into maturity choice, see Karlyn Mitchell, "The Debt Maturity Choice: An Empirical Investigation," *Journal of Financial Research*, Winter 1993, pp. 309–320.

Advantages of Short-Term Financing

First, a short-term loan can be obtained much faster than long-term credit. Lenders will insist on a more thorough financial examination before extending long-term credit, and the loan agreement will have to be spelled out in considerable detail because a lot can happen during the life of a 10- to 20-year loan. Therefore, if funds are needed in a hurry, the firm should look to the short-term markets.

Second, if its needs for funds are seasonal or cyclical, a firm may not want to commit itself to long-term debt: (1) Flotation costs are higher for long-term debt than for short-term credit. (2) Although long-term debt can be repaid early, provided the loan agreement includes a prepayment provision, prepayment penalties can be expensive. Accordingly, if a firm thinks its need for funds will diminish in the near future, it should choose short-term debt. (3) Long-term loan agreements always contain provisions, or covenants, which constrain the firm's future actions. Short-term credit agreements are generally less restrictive.

Third, the yield curve is normally upward sloping, indicating that interest rates are generally lower on short-term debt. Thus, under normal conditions, interest costs at the time the funds are obtained will be lower if the firm borrows on a short-term rather than a long-term basis.

Disadvantages of Short-Term Debt

Even though short-term rates are often lower than long-term rates, short-term credit is riskier for two reasons: (1) If a firm borrows on a long-term basis, its interest costs will be relatively stable over time, but if it uses short-term credit, its interest expense will fluctuate widely, at times going quite high. For example, the rate banks charged large corporations for short-term debt more than tripled over a two-year period in the 1980s, rising from 6.25 to 21%. Many firms that had borrowed heavily on a short-term basis simply could not meet their rising interest costs, and as a result, bankruptcies hit record levels during that period. (2) If a firm borrows heavily on a short-term basis, a temporary recession may render it unable to repay this debt. If the borrower is in a weak financial position, the lender may not extend the loan, which could force the firm into bankruptcy.

SELF-TEST What are the advantages and disadvantages of short-term debt over long-term debt?

22.12 Short-Term Bank Loans

Loans from commercial banks generally appear on balance sheets as notes payable. A bank's influence is actually greater than it appears from the dollar amounts because banks provide *nonspontaneous* funds. As a firm's financing needs increase, it requests additional funds from its bank. If the request is denied, the firm may be forced to abandon attractive growth opportunities. The key features of bank loans are discussed in the following paragraphs.

Maturity

Although banks do make longer-term loans, *the bulk of their lending is on a short-term basis*—about two-thirds of all bank loans mature in a year or less. Bank loans

to businesses are frequently written as 90-day notes, so the loan must be repaid or renewed at the end of 90 days. Of course, if a borrower's financial position has deteriorated, the bank may refuse to renew the loan. This can mean serious trouble for the borrower.

Promissory Notes

When a bank loan is approved, the agreement is executed by signing a **promissory note**. The note specifies (1) the amount borrowed; (2) the interest rate; (3) the repayment schedule, which can call for either a lump sum or a series of installments; (4) any collateral that might have to be put up as security for the loan; and (5) any other terms and conditions to which the bank and the borrower have agreed. When the note is signed, the bank credits the borrower's checking account with the funds, so on the borrower's balance sheet both cash and notes payable increase.

Compensating Balances

Banks sometimes require borrowers to maintain an average demand deposit (checking account) balance equal to from 10% to 20% of the face amount of the loan. This is called a **compensating balance**, and such balances raise the effective interest rate on the loans. For example, if a firm needs \$80,000 to pay off outstanding obligations, but if it must maintain a 20% compensating balance, then it must borrow \$100,000 to obtain a usable \$80,000. If the stated annual interest rate is 8%, the effective cost is actually 10%: \$8,000 interest divided by \$80,000 of usable funds equals 10%.¹⁷

As we noted earlier in the chapter, recent surveys indicate that compensating balances are much less common now than 20 years ago. In fact, compensating balances are now illegal in many states. Despite this trend, some small banks in states where compensating balances are legal still require their customers to maintain compensating balances.

Informal Line of Credit

A **line of credit** is an informal agreement between a bank and a borrower indicating the maximum credit the bank will extend to the borrower. For example, on December 31, a bank loan officer might indicate to a financial manager that the bank regards the firm as being "good" for up to \$80,000 during the forthcoming year, provided the borrower's financial condition does not deteriorate. If on January 10 the financial manager signs a promissory note for \$15,000 for 90 days, this would be called "taking down" \$15,000 of the total line of credit. This amount would be credited to the firm's checking account at the bank, and before repayment of the \$15,000, the firm could borrow additional amounts up to a total of \$80,000 outstanding at any one time.

Revolving Credit Agreement

A **revolving credit agreement** is a formal line of credit often used by large firms. To illustrate, in 2007 Texas Petroleum Company negotiated a revolving credit agreement for \$100 million with a group of banks. The banks were formally committed for 4 years to lend the firm up to \$100 million if the funds were needed. Texas Petroleum, in turn, paid an annual commitment fee of $\frac{1}{4}$ of 1% on the unused

¹⁷Note, however, that the compensating balance may be set as a minimum monthly *average*, and if the firm would maintain this average anyway, the compensating balance requirement would not raise the effective interest rate. Also, note that these *loan* compensating balances are added to any compensating balances that the firm's bank may require for *services performed*, such as clearing checks.

balance of the commitment to compensate the banks for making the commitment. Thus, if Texas Petroleum did not take down any of the \$100 million commitment during a year, it would still be required to pay a \$250,000 annual fee, normally in monthly installments of \$20,833.33. If it borrowed \$50 million on the first day of the agreement, the unused portion of the line of credit would fall to \$50 million, and the annual fee would fall to \$125,000. Of course, interest would also have to be paid on the money Texas Petroleum actually borrowed. As a general rule, the interest rate on “revolvers” is pegged to the prime rate, the T-bill rate, or some other market rate, so the cost of the loan varies over time as interest rates change. Texas Petroleum’s rate was set at prime plus 0.5 percentage point.

Note that a revolving credit agreement is very similar to an informal line of credit, but with an important difference: The bank has a *legal obligation* to honor a revolving credit agreement, and it receives a commitment fee. Neither the legal obligation nor the fee exists under the informal line of credit.

Often a line of credit will have a **cleanup clause** that requires the borrower to reduce the loan balance to zero at least once a year. Keep in mind that a line of credit typically is designed to help finance negative operating cash flows that are incurred as a natural part of a company’s business cycle, not as a source of permanent capital. For example, the total annual operating cash flow of Toys “R” Us is normally positive, even though its operating cash flow is negative during the fall as it builds up inventory for the Christmas season. However, Toys “R” Us has large positive cash flows in December through February, as it collects on Christmas sales. Their bankers would expect Toys “R” Us to use those positive cash flows to pay off balances that had been drawn against their credit lines. Otherwise, Toys “R” Us would be using its credit lines as a permanent source of financing.

SELF-TEST

Explain how a firm that expects to need funds during the coming year might make sure the needed funds will be available.

22.13 Commercial Paper

Commercial paper is a type of unsecured promissory note issued by large, strong firms and sold primarily to other business firms, to insurance companies, to pension funds, to money market mutual funds, and to banks. In mid-2006, there was approximately \$1,793 billion of commercial paper outstanding, versus about \$1,165 billion of commercial and industrial bank loans. Most commercial paper outstanding is issued by financial institutions.

Maturity and Cost

Maturities of commercial paper generally vary from 1 day to 9 months, with an average of about 5 months.¹⁸ The interest rate on commercial paper fluctuates with supply and demand conditions—it is determined in the marketplace, varying daily as conditions change. Recently, commercial paper rates have ranged from 1½ to 3½ percentage points below the stated prime rate, and up to ½ of a percentage point above the T-bill rate. For example, in August 2006, the average rate on 3-month commercial paper was 5.21%, the stated prime rate was 8.25%, and the 3-month T-bill rate was 5.10%.



For updates on the outstanding balances of commercial paper, go to <http://www.federalreserve.gov/releases> and check out the daily releases for Commercial Paper and the weekly releases for Assets and Liabilities of Commercial Banks in the United States.

¹⁸The maximum maturity without SEC registration is 270 days. Also, commercial paper can only be sold to “sophisticated” investors; otherwise, SEC registration would be required even for maturities of 270 days or less.

Use of Commercial Paper



For current rates, see <http://www.federalreserve.gov/releases> and look at the Daily Releases for Selected Interest Rates.

The use of commercial paper is restricted to a comparatively small number of very large concerns that are exceptionally good credit risks. Dealers prefer to handle the paper of firms whose net worth is \$100 million or more and whose annual borrowing exceeds \$10 million. One potential problem with commercial paper is that a debtor who is in temporary financial difficulty may receive little help because commercial paper dealings are generally less personal than are bank relationships. Thus, banks are generally more able and willing to help a good customer weather a temporary storm than is a commercial paper dealer. On the other hand, using commercial paper permits a corporation to tap a wide range of credit sources, including financial institutions outside its own area and industrial corporations across the country, and this can reduce interest costs.

SELF-TEST

What is commercial paper?

What types of companies can use commercial paper to meet their short-term financing needs?

How does the cost of commercial paper compare with the cost of short-term bank loans? With the cost of Treasury bills?

22.14 Use of Security in Short-Term Financing

Thus far, we have not addressed the question of whether or not short-term loans should be secured. Commercial paper is never secured, but other types of loans can be secured if this is deemed necessary or desirable. Other things held constant, it is better to borrow on an unsecured basis, since the bookkeeping costs of **secured loans** are often high. However, firms often find that they can borrow only if they put up some type of collateral to protect the lender, or that by using security they can borrow at a much lower rate.

Several different kinds of collateral can be employed, including marketable stocks or bonds, land or buildings, equipment, inventory, and accounts receivable. Marketable securities make excellent collateral, but few firms that need loans also hold portfolios of stocks and bonds. Similarly, real property (land and buildings) and equipment are good forms of collateral, but they are generally used as security for long-term loans rather than for working capital loans. Therefore, most secured short-term business borrowing involves the use of accounts receivable and inventories as collateral.

To understand the use of security, consider the case of a Chicago hardware dealer who wanted to modernize and expand his store. He requested a \$200,000 bank loan. After examining his business's financial statements, the bank indicated that it would lend him a maximum of \$100,000 and that the effective interest rate would be 12.1%. The owner had a substantial personal portfolio of stocks, and he offered to put up \$300,000 of high-quality stocks to support the \$200,000 loan. The bank then granted the full \$200,000 loan, and at the prime rate of 9.5%. The store owner might also have used his inventories or receivables as security for the loan, but processing costs would have been high.¹⁹

For a more detailed discussion of secured financing, see *Web Extension 22A* at the textbook's Web site.



¹⁹The term "asset-based financing" is often used as a synonym for "secured financing." In recent years, accounts receivable have been used as security for long-term bonds, and this permits corporations to borrow from lenders such as pension funds rather than being restricted to banks and other traditional short-term lenders.

SELF-TEST

What is a secured loan?

What are some types of current assets that are pledged as security for short-term loans?

Summary

This chapter discussed working capital management and short-term financing. The key concepts covered are listed below.

- **Working capital** refers to current assets, and **net working capital** is defined as current assets minus current liabilities. **Net operating working capital** is defined as operating current assets minus operating current liabilities.
- The **cash conversion cycle model** focuses on the length of time between when the company makes payments and when it receives cash inflows.
- The **inventory conversion period** is the average time required to convert materials into finished goods and then to sell those goods.

$$\text{Inventory conversion period} = \text{Inventory/Sales per day}$$

- The **receivables collection period** is the average length of time required to convert the firm's receivables into cash, that is, to collect cash following a sale.

$$\text{Receivables collection period} = \text{DSO} = \text{Receivables}/(\text{Sales}/365)$$

- The **payables deferral period** is the average length of time between the purchase of materials and labor and the payment of cash for them.

$$\text{Payables deferral period} = \text{Payables/Purchases per day}$$

- The **cash conversion cycle** equals the length of time between the firm's actual cash expenditures to pay for productive resources (materials and labor) and its own cash receipts from the sale of products (that is, the length of time between paying for labor and materials and collecting on receivables).

$$\begin{array}{ccccccc} \text{Cash} & & \text{Inventory} & & \text{Receivables} & & \text{Payables} \\ \text{conversion} & = & \text{conversion} & + & \text{collection} & - & \text{deferral} \\ \text{cycle} & & \text{period} & & \text{period} & & \text{period} \end{array}$$

- Under a **relaxed working capital policy**, a firm would hold relatively large amounts of each type of current asset. Under a **restricted working capital policy**, the firm would hold minimal amounts of these items.
- The **primary goal of cash management** is to reduce the amount of cash to the minimum necessary to conduct business.
- The **transactions balance** is the cash necessary to conduct day-to-day business, whereas the **precautionary balance** is a cash reserve held to meet random, unforeseen needs. A **compensating balance** is a minimum checking account balance that a bank requires as compensation either for services provided or as part of a loan agreement.
- A **cash budget** is a schedule showing projected cash inflows and outflows over some period. The cash budget is used to predict cash surpluses and deficits, and it is the primary cash management planning tool.

- The twin goals of **inventory management** are (1) to ensure that the inventories needed to sustain operations are available, but (2) to hold the costs of ordering and carrying inventories to the lowest possible level.
- **Inventory costs** can be divided into three types: carrying costs, ordering costs, and stock-out costs. In general, carrying costs increase as the level of inventory rises, but ordering costs and stock-out costs decline with larger inventory holdings.
- When a firm sells goods to a customer on credit, an **account receivable** is created.
- A firm can use an **aging schedule** and the **days sales outstanding (DSO)** to help keep track of its receivables position and to help avoid an increase in bad debts.
- A firm's **credit policy** consists of four elements: (1) credit period, (2) discounts given for early payment, (3) credit standards, and (4) collection policy.
- **Permanent net operating working capital** is the NOWC that the firm holds even during slack times, whereas **temporary NOWC** is the additional NOWC needed during seasonal or cyclical peaks. The methods used to finance permanent and temporary NOWC define the firm's **short-term financing policy**.
- A **moderate** approach to short-term financing involves matching, to the extent possible, the maturities of assets and liabilities, so that temporary NOWC is financed with short-term debt, and permanent NOWC and fixed assets are financed with long-term debt or equity. Under an **aggressive** approach, some permanent NOWC, and perhaps even some fixed assets, are financed with short-term debt. A **conservative** approach would be to use long-term sources to finance all permanent operating capital and some of the temporary NOWC.
- The advantages of short-term credit are (1) the **speed** with which short-term loans can be arranged, (2) increased **flexibility**, and (3) the fact that short-term **interest rates** are generally **lower** than long-term rates. The principal disadvantage of short-term credit is the **extra risk** the borrower must bear because (1) the lender can demand payment on short notice and (2) the cost of the loan will increase if interest rates rise.
- **Accounts payable**, or **trade credit**, arises spontaneously as a result of credit purchases. Firms should use all the **free trade credit** they can obtain, but they should use **costly trade credit** only if it is less expensive than other forms of short-term debt. Suppliers often offer discounts to customers who pay within a stated discount period. The following equation may be used to calculate the nominal cost, on an annual basis, of not taking discounts:

$$\text{Nominal annual cost} = \frac{\text{Discount percent}}{100 - \text{Discount percent}} \times \frac{365}{\text{Days credit is outstanding} - \text{Discount period}}$$

- **Bank loans** are an important source of short-term credit. When a bank loan is approved, a **promissory note** is signed. It specifies: (1) the amount borrowed, (2) the percentage interest rate, (3) the repayment schedule, (4) the collateral, and (5) any other conditions to which the parties have agreed.
- Banks sometimes require borrowers to maintain **compensating balances**, which are deposit requirements set at between 10% and 20% of the loan amount. Compensating balances raise the effective interest rate on bank loans.
- A **line of credit** is an informal agreement between the bank and the borrower indicating the maximum amount of credit the bank will extend to the borrower.
- A **revolving credit agreement** is a formal line of credit often used by large firms; it involves a **commitment fee**.

- **Commercial paper** is unsecured short-term debt issued by large, financially strong corporations. Although the cost of commercial paper is lower than the cost of bank loans, it can be used only by large firms with exceptionally strong credit ratings.
- Sometimes a borrower will find that it is necessary to borrow on a **secured basis**, in which case the borrower pledges assets such as real estate, securities, equipment, inventories, or accounts receivable as collateral for the loan.

Questions

- (22-1) Define each of the following terms:
- Working capital; net working capital; net operating working capital
 - Inventory conversion period; receivables collection period; payables deferral period; cash conversion cycle
 - Relaxed NOWC policy; restricted NOWC policy; moderate NOWC policy
 - Transactions balance; compensating balance; precautionary balance
 - Cash budget; target cash balance
 - Trade discounts
 - Account receivable; days sales outstanding; aging schedule
 - Credit policy; credit period; credit standards; collection policy; cash discounts
 - Permanent NOWC; temporary NOWC
 - Moderate short-term financing policy; aggressive short-term financing policy; conservative short-term financing policy
 - Maturity matching, or “self-liquidating,” approach
 - Accruals
 - Trade credit; stretching accounts payable; free trade credit; costly trade credit
 - Promissory note; line of credit; revolving credit agreement
 - Commercial paper; secured loan
- (22-2) What are the two principal reasons for holding cash? Can a firm estimate its target cash balance by summing the cash held to satisfy each of the two reasons?
- (22-3) Is it true that when one firm sells to another on credit, the seller records the transaction as an account receivable while the buyer records it as an account payable and that, disregarding discounts, the receivable typically exceeds the payable by the amount of profit on the sale?
- (22-4) What are the four elements of a firm’s credit policy? To what extent can firms set their own credit policies as opposed to having to accept policies that are dictated by “the competition”?
- (22-5) What are the advantages of matching the maturities of assets and liabilities? What are the disadvantages?
- (22-6) From the standpoint of the borrower, is long-term or short-term credit riskier? Explain. Would it ever make sense to borrow on a short-term basis if short-term rates were above long-term rates?
- (22-7) “Firms can control their accruals within fairly wide limits.” Discuss.

- (22-8) Is it true that most firms are able to obtain some free trade credit and that additional trade credit is often available, but at a cost? Explain.
- (22-9) What kinds of firms use commercial paper?

Self-Test Problems Solutions Appear in Appendix A

(ST-1) Working Capital Policy The Calgary Company is attempting to establish a current assets policy. Fixed assets are \$600,000, and the firm plans to maintain a 50% debt-to-assets ratio. Calgary has no operating current liabilities. The interest rate is 10% on all debt. Three alternative current asset policies are under consideration: 40%, 50%, and 60% of projected sales. The company expects to earn 15% before interest and taxes on sales of \$3 million. Calgary's effective federal-plus-state tax rate is 40%. What is the expected return on equity under each alternative?

(ST-2) Current Asset Financing Vanderheiden Press Inc. and the Herrenhouse Publishing Company had the following balance sheets as of December 31, 2007 (thousands of dollars):

	Vanderheiden Press	Herrenhouse Publishing
Current assets	\$100,000	\$ 80,000
Fixed assets (net)	<u>100,000</u>	<u>120,000</u>
Total assets	<u>\$200,000</u>	<u>\$200,000</u>
Current liabilities	\$ 20,000	\$ 80,000
Long-term debt	80,000	20,000
Common stock	50,000	50,000
Retained earnings	<u>50,000</u>	<u>50,000</u>
Total liabilities and equity	<u>\$200,000</u>	<u>\$200,000</u>

Earnings before interest and taxes for both firms are \$30 million, and the effective federal-plus-state tax rate is 40%.

- What is the return on equity for each firm if the interest rate on current liabilities is 10% and the rate on long-term debt is 13%?
- Assume that the short-term rate rises to 20%. While the rate on new long-term debt rises to 16%, the rate on existing long-term debt remains unchanged. What would be the return on equity for Vanderheiden Press and Herrenhouse Publishing under these conditions?
- Which company is in a riskier position? Why?

Problems Answers Appear in Appendix B

Easy
Problems 1–5

(22-1) Cash Management Williams & Sons last year reported sales of \$10 million and an inventory turnover ratio of 2. The company is now adopting a new inventory system. If the new system is able to reduce the firm's inventory level and increase the firm's inventory

turnover ratio to 5 while maintaining the same level of sales, how much cash will be freed up?

(22-2) Medwig Corporation has a DSO of 17 days. The company averages \$3,500 in credit sales each day. What is the company's average accounts receivable?

Receivables Investment

(22-3) What is the nominal and effective cost of trade credit under the credit terms of 3/15, net 30?

Cost of Trade Credit

(22-4) A large retailer obtains merchandise under the credit terms of 1/15, net 45, but routinely takes 60 days to pay its bills. Given that the retailer is an important customer, suppliers allow the firm to stretch its credit terms. What is the retailer's effective cost of trade credit?

Cost of Trade Credit

(22-5) A chain of appliance stores, APP Corporation, purchases inventory with a net price of \$500,000 each day. The company purchases the inventory under the credit terms of 2/15, net 40. APP always takes the discount, but takes the full 15 days to pay its bills. What is the average accounts payable for APP?

Accounts Payable

Intermediate Problems 6–12

(22-6) McDowell Industries sells on terms of 3/10, net 30. Total sales for the year are \$912,500. Forty percent of the customers pay on the 10th day and take discounts; the other 60% pay, on average, 40 days after their purchases.

Receivables Investment

- What is the days sales outstanding?
- What is the average amount of receivables?
- What would happen to average receivables if McDowell toughened up on its collection policy with the result that all nondiscount customers paid on the 30th day?

(22-7) Calculate the nominal annual cost of nonfree trade credit under each of the following terms. Assume payment is made either on the due date or on the discount date.

Cost of Trade Credit

- 1/15, net 20
- 2/10, net 60
- 3/10, net 45
- 2/10, net 45
- 2/15, net 40

(22-8) a. If a firm buys under terms of 3/15, net 45, but actually pays on the 20th day and *still takes the discount*, what is the nominal cost of its nonfree trade credit?

Cost of Trade Credit

- Does it receive more or less credit than it would if it paid within 15 days?

(22-9) Grunewald Industries sells on terms of 2/10, net 40. Gross sales last year were \$4,562,500, and accounts receivable averaged \$437,500. Half of Grunewald's customers paid on the 10th day and took discounts. What are the nominal and effective costs of trade credit to Grunewald's nondiscount customers? (Hint: Calculate sales/day based on a 365-day year; then get average receivables of discount customers; then find the DSO for the nondiscount customers.)

Cost of Trade Credit

(22-10) The D.J. Masson Corporation needs to raise \$500,000 for 1 year to supply working capital to a new store. Masson buys from its suppliers on terms of 3/10, net 90, and it currently pays on the 10th day and takes discounts, but it could forgo

Effective Cost of Trade Credit

discounts, pay on the 90th day, and get the needed \$500,000 in the form of costly trade credit. What is the effective annual interest rate of the costly trade credit?

(22-11)
Cash Conversion Cycle

The Zocco Corporation has an inventory conversion period of 75 days, a receivables collection period of 38 days, and a payables deferral period of 30 days.

- What is the length of the firm's cash conversion cycle?
- If Zocco's annual sales are \$3,421,875 and all sales are on credit, what is the firm's investment in accounts receivable?
- How many times per year does Zocco turn over its inventory?

(22-12)
Working Capital Cash
Flow Cycle

The Christie Corporation is trying to determine the effect of its inventory turnover ratio and days sales outstanding (DSO) on its cash flow cycle. Christie's sales last year (all on credit) were \$150,000, and it earned a net profit of 6%, or \$9,000. It turned over its inventory 5 times during the year, and its DSO was 36.5 days. The firm had fixed assets totaling \$35,000. Christie's payables deferral period is 40 days.

- Calculate Christie's cash conversion cycle.
- Assuming Christie holds negligible amounts of cash and marketable securities, calculate its total assets turnover and ROA.
- Suppose Christie's managers believe that the inventory turnover can be raised to 7.3 times. What would Christie's cash conversion cycle, total assets turnover, and ROA have been if the inventory turnover had been 7.3 for the year?

Challenging Problems 13–17

(22-13)
Working Capital Policy

The Rentz Corporation is attempting to determine the optimal level of current assets for the coming year. Management expects sales to increase to approximately \$2 million as a result of an asset expansion presently being undertaken. Fixed assets total \$1 million, and the firm wishes to maintain a 60% debt ratio. Rentz's interest cost is currently 8% on both short-term and longer-term debt (which the firm uses in its permanent structure). Three alternatives regarding the projected current asset level are available to the firm: (1) a tight policy requiring current assets of only 45% of projected sales, (2) a moderate policy of 50% of sales in current assets, and (3) a relaxed policy requiring current assets of 60% of sales. The firm expects to generate earnings before interest and taxes at a rate of 12% on total sales.

- What is the expected return on equity under each current asset level? (Assume a 40% effective federal-plus-state tax rate.)
- In this problem, we have assumed that the level of expected sales is independent of current asset policy. Is this a valid assumption?
- How would the overall riskiness of the firm vary under each policy?

(22-14)
Cash Budgeting

Dorothy Koehl recently leased space in the Southside Mall and opened a new business, Koehl's Doll Shop. Business has been good, but Koehl has frequently run out of cash. This has necessitated late payment on certain orders, which, in turn, is beginning to cause a problem with suppliers. Koehl plans to borrow from the bank to have cash ready as needed, but first she needs a forecast of just how much she must borrow. Accordingly, she has asked you to prepare a cash budget for the critical period around Christmas, when needs will be especially high.

Sales are made on a cash basis only. Koehl's purchases must be paid for during the following month. Koehl pays herself a salary of \$4,800 per month, and the rent is \$2,000 per month. In addition, she must make a tax payment of \$12,000 in December. The current cash on hand (on December 1) is \$400, but Koehl has agreed to maintain an average bank balance of \$6,000—this is her target cash balance. (Disregard till cash, which is insignificant because Koehl keeps only a small amount on hand in order to lessen the chances of robbery.)

The estimated sales and purchases for December, January, and February are shown below. Purchases during November amounted to \$140,000.

	Sales	Purchases
December	\$160,000	\$40,000
January	40,000	40,000
February	60,000	40,000

- Prepare a cash budget for December, January, and February.
- Now, suppose Koehl were to start selling on a credit basis on December 1, giving customers 30 days to pay. All customers accept these terms, and all other facts in the problem are unchanged. What would the company's loan requirements be at the end of December in this case? (Hint: The calculations required to answer this question are minimal.)

(22-15) Suppose a firm makes purchases of \$3.65 million per year under terms of 2/10, net 30, and takes discounts.

Cash Discounts

- What is the average amount of accounts payable net of discounts? (Assume that the \$3.65 million of purchases is net of discounts—that is, gross purchases are \$3,724,489.80, discounts are \$74,489.80, and net purchases are \$3.65 million.)
- Is there a cost of the trade credit the firm uses?
- If the firm did not take discounts but it did pay on the due date, what would be its average payables and the cost of this nonfree trade credit?
- What would its cost of not taking discounts be if it could stretch its payments to 40 days?

(22-16) The Thompson Corporation projects an increase in sales from \$1.5 million to \$2 million, but it needs an additional \$300,000 of current assets to support this expansion. Thompson can finance the expansion by no longer taking discounts, thus increasing accounts payable. Thompson purchases under terms of 2/10, net 30, but it can delay payment for an additional 35 days—paying in 65 days and thus becoming 35 days past due—without a penalty because of its suppliers' current excess capacity problems. What is the effective, or equivalent, annual cost of the trade credit?

Trade Credit

(22-17) The Raattama Corporation had sales of \$3.5 million last year, and it earned a 5% return, after taxes, on sales. Recently, the company has fallen behind in its accounts payable. Although its terms of purchase are net 30 days, its accounts payable represent 60 days' purchases. The company's treasurer is seeking to increase bank borrowings in order to become current in meeting its trade obligations (that is, to have 30 days' payables outstanding). The company's balance sheet is as follows (thousands of dollars):

Bank Financing

Cash	\$ 100	Accounts payable	\$ 600
Accounts receivable	300	Bank loans	700
Inventory	1,400	Accruals	200
Current assets	<u>\$1,800</u>	Current liabilities	<u>\$1,500</u>
Land and buildings	600	Mortgage on real estate	700
Equipment	600	Common stock, \$0.10 par	300
		Retained earnings	<u>500</u>
Total assets	<u>\$3,000</u>	Total liabilities and equity	<u>\$3,000</u>

- How much bank financing is needed to eliminate the past-due accounts payable?
- Would you as a bank loan officer make the loan? Why or why not?

Spreadsheet Problem

(22-18)
Build a Model: Cash
Budgeting



Start with the partial model in the file *FM12 Ch 22 P18 Build a Model.xls* from the textbook's Web site. Helen Bowers, owner of Helen's Fashion Designs, is planning to request a line of credit from her bank. She has estimated the following sales forecasts for the firm for parts of 2008 and 2009:

	Sales	Labor and Raw Materials
May 2008	\$180,000	\$ 90,000
June	180,000	90,000
July	360,000	126,000
August	540,000	882,000
September	720,000	306,000
October	360,000	234,000
November	360,000	162,000
December	90,000	90,000
January 2009	180,000	NA

Collection estimates obtained from the credit and collection department are as follows: collections within the month of sale, 10%; collections the month following the sale, 75%; collections the second month following the sale, 15%. Payments for labor and raw materials are typically made during the month following the one in which these costs have been incurred. Total labor and raw materials costs are estimated for each month as shown above.

General and administrative salaries will amount to approximately \$27,000 a month; lease payments under long-term lease contracts will be \$9,000 a month; depreciation charges will be \$36,000 a month; miscellaneous expenses will be \$2,700 a month; income tax payments of \$63,000 will be due in both September and December; and a progress payment of \$180,000 on a new design studio must be paid in October. Cash on hand on July 1 will amount to \$132,000, and a minimum cash balance of \$90,000 will be maintained throughout the cash budget period.

- a. Prepare a monthly cash budget for the last 6 months of 2008.
- b. Prepare an estimate of the required financing (or excess funds)—that is, the amount of money Bowers will need to borrow (or will have available to invest)—for each month during that period.
- c. Assume that receipts from sales come in uniformly during the month (that is, cash receipts come in at the rate of 1/30 each day), but all outflows are paid on the 5th of the month. Will this have an effect on the cash budget—in other words, would the cash budget you have prepared be valid under these assumptions? If not, what can be done to make a valid estimate of peak financing requirements? No calculations are required, although calculations can be used to illustrate the effects.
- d. Bowers produces on a seasonal basis, just ahead of sales. Without making any calculations, discuss how the company's current ratio and debt ratio would vary during the year assuming all financial requirements were met by short-term bank loans. Could changes in these ratios affect the firm's ability to obtain bank credit?
- e. If its customers began to pay late, this would slow down collections and thus increase the required loan amount. Also, if sales dropped off, this would have an effect on the required loan. Do a sensitivity analysis that shows the effects of these two factors on the maximum loan requirement.



e-resource

Cyberproblem

Please go to the textbook's Web site to access any Cyberproblems.

Mini Case



Dan Barnes, financial manager of Ski Equipment Inc. (SKI), is excited, but apprehensive. The company's founder recently sold his 51% controlling block of stock to Kent Koren, who is a big fan of EVA (Economic Value Added). EVA is found by taking the after-tax operating profit and then subtracting the dollar cost of all the capital the firm uses:

$$\begin{aligned} \text{EVA} &= \text{NOPAT} - \text{Capital costs} \\ &= \text{EBIT}(1 - T) - \text{WACC}(\text{Capital employed}). \end{aligned}$$

If EVA is positive, then the firm is creating value. On the other hand, if EVA is negative, the firm is not covering its cost of capital, and stockholders' value is being eroded. Koren rewards managers handsomely if they create value, but those whose operations produce negative EVAs are soon looking for work. Koren frequently points out that if a company could generate its current level of sales with fewer assets, it would need less capital. That would, other things held constant, lower capital costs and increase its EVA.

Shortly after he took control of SKI, Kent Koren met with SKI's senior executives to tell them of his plans for the company. First, he presented some EVA data that convinced everyone that SKI had not been creating value in recent years. He then stated, in no uncertain terms, that this situation must change. He noted that

SKI's designs of skis, boots, and clothing are acclaimed throughout the industry, but something is seriously amiss elsewhere in the company. Costs are too high, prices are too low, or the company employs too much capital, and he wants SKI's managers to correct the problem or else.

Barnes has long felt that SKI's working capital situation should be studied—the company may have the optimal amounts of cash, securities, receivables, and inventories, but it may also have too much or too little of these items. In the past, the production manager resisted Barnes's efforts to question his holdings of raw materials inventories, the marketing manager resisted questions about finished goods, the sales staff resisted questions about credit policy (which affects accounts receivable), and the treasurer did not want to talk about her cash and securities balances. Koren's speech made it clear that such resistance would no longer be tolerated.

Barnes also knows that decisions about working capital cannot be made in a vacuum. For example, if inventories could be lowered without adversely affecting operations, then less capital would be required, the dollar cost of capital would decline, and EVA would increase. However, lower raw materials inventories might lead to production slowdowns and higher costs, while lower finished goods inventories might lead to the loss of profitable sales. So, before inventories are changed, it will be necessary to study operating as well as financial effects. The situation is the same with regard to cash and receivables. Barnes began collecting the ratios shown below.

	SKI	Industry
Current	1.75	2.25
Quick	0.83	1.20
Debt/assets	58.76%	50.00%
Turnover of cash and securities	16.67	22.22
Days sales outstanding (365-day basis)	45.63	32.00
Inventory turnover	4.82	7.00
Fixed assets turnover	11.35	12.00
Total assets turnover	2.08	3.00
Profit margin on sales	2.07%	3.50%
Return on equity (ROE)	10.45%	21.00%
Payables deferral period	30.00	33.00

	Nov	Dec	Jan	Feb	Mar	Apr
I. Collections and Purchases						
Worksheet						
(1) Sales (gross)	\$71,218	\$68,212	\$65,213	\$52,475	\$42,909	\$30,524
Collections						
(2) During month of sale						
(0.2)(0.98)(month's sales)			12,781.75	10,285.10		
(3) During first month after sale						
(0.7)(previous month's sales)			47,748.40	45,649.10		
(4) During second month after sale						
(0.1)(sales 2 months ago)			<u>7,121.80</u>	<u>6,821.20</u>		
(5) Total collections						
(Lines 2 + 3 + 4)			<u>\$67,651.95</u>	<u>\$62,755.40</u>		

	Nov	Dec	Jan	Feb	Mar	Apr
Purchases						
(6) (0.85)(forecasted sales 2 months from now)		\$44,603.75	\$36,472.65	\$25,945.40		
(7) Payments (1-month lag)			44,603.75	36,472.65		
II. Cash Gain or Loss for Month						
(8) Collections (from Section I)			\$67,651.95	\$62,755.40		
(9) Payments for purchases (from Section I)			44,603.75	36,472.65		
(10) Wages and salaries			6,690.56	5,470.90		
(11) Rent			<u>2,500.00</u>	<u>2,500.00</u>		
(12) Taxes						
(13) Total payments			<u>\$53,794.31</u>	<u>\$44,443.55</u>		
(14) Net cash gain (loss) during month (Line 8 – Line 13)			<u>\$13,857.64</u>	<u>\$18,311.85</u>		
III. Cash Surplus or Loan Requirement						
(15) Cash at beginning of month if no borrowing is done			<u>\$ 3,000.00</u>	<u>\$16,857.64</u>		
(16) Cumulative cash (cash at start + gain or – loss = Line 14 + Line 15)			16,857.64	35,169.49		
(17) Target cash balance			<u>1,500.00</u>	<u>1,500.00</u>		
(18) Cumulative surplus cash or loans outstanding to maintain \$1,500 target cash balance (Line 16 – Line 17)			<u>\$15,357.64</u>	<u>\$33,669.49</u>		

- Barnes plans to use the preceding ratios as the starting point for discussions with SKI's operating executives. He wants everyone to think about the pros and cons of changing each type of current asset and how changes would interact to affect profits and EVA. Based on the data, does SKI seem to be following a relaxed, moderate, or restricted working capital policy?
- How can one distinguish between a relaxed but rational working capital policy and a situation in which a firm simply has a lot of current assets because it is inefficient? Does SKI's working capital policy seem appropriate?
- Calculate the firm's cash conversion cycle. Assume a 365-day year.
- What might SKI do to reduce its cash without harming operations?

In an attempt to better understand SKI's cash position, Barnes developed a cash budget. Data for the first 2 months of the year are shown above. (Note that Barnes's preliminary cash budget does not account for interest income or interest expense.) He has the figures for the other months, but they are not shown.

- Should depreciation expense be explicitly included in the cash budget? Why or why not?

- f. In his preliminary cash budget, Barnes has assumed that all sales are collected and, thus, that SKI has no bad debts. Is this realistic? If not, how would bad debts be dealt with in a cash budgeting sense? (Hint: Bad debts will affect collections but not purchases.)
- g. Barnes's cash budget for the entire year, although not given here, is based heavily on his forecast for monthly sales. Sales are expected to be extremely low between May and September but then increase dramatically in the fall and winter. November is typically the firm's best month, when SKI ships equipment to retailers for the holiday season. Interestingly, Barnes's forecasted cash budget indicates that the company's cash holdings will exceed the targeted cash balance every month except for October and November, when shipments will be high but collections will not be coming in until later. Based on the ratios shown earlier, does it appear that SKI's target cash balance is appropriate? In addition to possibly lowering the target cash balance, what actions might SKI take to better improve its cash management policies, and how might that affect its EVA?
- h. What reasons might SKI have for maintaining a relatively high amount of cash?
- i. What are the three categories of inventory costs? If the company takes steps to reduce its inventory, what effect would this have on the various costs of holding inventory?
- j. Is there any reason to think that SKI may be holding too much inventory? If so, how would that affect EVA and ROE?
- k. If the company reduces its inventory without adversely affecting sales, what effect should this have on the company's cash position (1) in the short run and (2) in the long run? Explain in terms of the cash budget and the balance sheet.
- l. Barnes knows that SKI sells on the same credit terms as other firms in its industry. Use the ratios presented earlier to explain whether SKI's customers pay more or less promptly than those of its competitors. If there are differences, does that suggest that SKI should tighten or loosen its credit policy? What four variables make up a firm's credit policy, and in what direction should each be changed by SKI?
- m. Does SKI face any risks if it tightens its credit policy?
- n. If the company reduces its DSO without seriously affecting sales, what effect would this have on its cash position (1) in the short run and (2) in the long run? Answer in terms of the cash budget and the balance sheet. What effect should this have on EVA in the long run?

In addition to improving the management of its current assets, SKI is also reviewing the ways in which it finances its current assets. With this concern in mind, Dan is also trying to answer the following questions.

- o. Is it likely that SKI could make significantly greater use of accruals?
 - p. Assume that SKI buys on terms of 1/10, net 30, but that it can get away with paying on the 40th day if it chooses not to take discounts. Also, assume that it purchases \$506,985 of equipment per year, net of discounts. How much free trade credit can the company get, how much costly trade credit can it get, and what is the percentage cost of the costly credit? Should SKI take discounts?
 - q. SKI tries to match the maturity of its assets and liabilities. Describe how SKI could adopt either a more aggressive or more conservative financing policy.
 - r. What are the advantages and disadvantages of using short-term debt as a source of financing?
 - s. Would it be feasible for SKI to finance with commercial paper?
-

Selected Additional Cases

The following cases from Textchoice, Thomson Learning's online case library, cover many of the concepts discussed in this chapter and are available at <http://www.textchoice2.com>.

Klein-Brigham Series:

Case 29, "Office Mates, Inc.," which illustrates how changes in current asset policy affect expected profitability and risk; Case 32, "Alpine Wear, Inc.," which illustrates the mechanics of the cash budget and

the rationale behind its use; Case 50, "Toy World, Inc.," and Case 66, "Sorenson Stove Company," which deal with cash budgeting; Case 33, "Upscale Toddlers, Inc.," which deals with credit policy changes; and Case 34, "Texas Rose Company," which focuses on receivables management.

Brigham-Buzzard Series:

Case 11, "Powerline Network Corporation (Working Capital Management)."