

STUDY UNIT EIGHT

WORKING CAPITAL POLICY AND MANAGEMENT

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This study unit addresses the management of the firm's current assets and its short-term financing options. Longer-term financing and investing issues are discussed in the next study unit.

8.1 FINANCIAL MANAGEMENT

1. The **primary objective of the firm** is to maximize the shareholders' wealth in the long term. This can be accomplished by paying dividends or increasing the price per share of common stock.
2. The market price of the stock is the result of the firm's investment and financing decisions within the context of legal and ethical bounds, including those relating to
 - a. Product safety
 - b. Minority hiring
 - c. Pollution control
 - d. Fair competition
 - e. Fair advertising
3. Other objectives of the firm are less beneficial to shareholders than wealth maximization.
 - a. **Profit maximization** sometimes may be inconsistent with the maximization of shareholder wealth. For example,
 - 1) Investing in high-risk projects may increase profits, but the increase may not be commensurate with the additional risk borne by the firm.
 - 2) Increasing equity investment (resulting in a lower return on equity) will lower EPS and the stock price.
 - 3) Delaying needed maintenance may increase accounting profits, but damage to capital may more than offset this increase in short-term profit.
 - b. **Sales maximization** is a nonoptimal objective since it may not result in increased profits.
 - 1) A firm wants to increase sales only when the marginal revenue from the sale is greater than (or equal to) the marginal cost of the sale. Only in this case, i.e., when an additional sale is profitable, is shareholders' wealth maximized.
 - c. **Social responsibility** is an important issue, but if it were the only objective of the firm, the firm's existence would be short.
 - 1) However, some mutual funds invest only in socially responsible firms. Consequently, social responsibility can increase the demand for a corporation's stocks and bonds and thus increase shareholder wealth.
4. Management's **investment decisions** are geared to obtaining a proper mix of productive assets, such as machinery and other capital assets. It must then obtain **financing** of these assets at the optimal cost of capital, thereby maximizing shareholders' wealth.

5. The investing and financing decisions are not independent.
 - a. The amount and **composition of assets** are directly related to the amount and composition of financing.
 - b. Given current and expected industry and overall economic conditions, the resulting mix of assets, liabilities, and capital determines the **business risk**. The business risk then affects the discount rate when investors value the company. Discount rates are discussed in Study Unit 9, but the effects of financial management on the value of the firm are integral to this study unit.
 - 1) Business risk is not completely controllable by management. There are also many “outside” (**exogenous**) variables, such as:
 - a) Technological developments
 - b) Weather
 - c) National fiscal policies
 - d) National monetary policies
 - e) International relations and their effect on particular industries
 - f) Competitors’ actions (may not be exogenous if they are affected by the company’s decisions)
6. **Tax strategy** is an important part of financial management.
 - a. **Taxes** (federal, state, local, and foreign) are an important consideration of financial management because they are frequently 25% to 50% of all costs. They include income, use, excise, property, legal document, payroll, and others.
 - 1) Thus, governmental services (national defense, fire, police, etc.) are an important and costly factor of production.
 - b. **Tax planning** is the heart of tax strategy.
 - 1) **Investment tax credits** have at times provided direct reduction of taxes when assets were purchased for use in the business.
 - a) The net effect is to decrease the cost of the asset.
 - b) The amount of the credit and limitations on the tax credit on used equipment affect investment decisions.
 - 2) **Accelerated depreciation** is permitted on many types of business assets.
 - a) Accordingly, in the early periods of an asset’s life, depreciation is higher, taxable income is lower, and the rate of return on investment is higher.
 - 3) **Corporate capital gains** are taxed at regular rates.
 - 4) **Special loss carryforward and carryback rules** permit businesses to deduct net operating losses incurred in one period against income earned in other periods.
 - 5) A **dividends received deduction** makes tax free 70% to 100% (based on stock ownership percentage) of dividends received by one corporation from investments in the stock of another.
 - a) The DRD prevents or reduces double taxation.
 - 6) **Interest** is a tax-deductible expense of the debtor.
 - a) But dividends on common or preferred stock are not deductible by the issuer.

7. **Working capital finance** concerns the optimal level, mix, and use of current assets and the means used to acquire them, notably current liabilities. The objective is to minimize the cost of maintaining liquidity (i.e., money in the bank) while guarding against the possibility of technical insolvency.
- a. From a financial analyst's perspective, **working capital** equals **current assets**. Its components include cash, marketable securities, receivables, and inventory. From the accounting perspective, working capital equals current assets minus current liabilities.
 - 1) **Assets** are current if they are reasonably expected to be realized in cash or sold or consumed during the normal operating cycle of the business.
 - 2) **Current liabilities** include trade accounts payable, taxes payable, unearned revenues, other accrued operating costs, short-term debt, and the currently due component of long-term debt. Liabilities are current if their liquidation will require the use of current assets or the incurrence of other current liabilities.
 - b. A firm that adopts a **conservative policy** seeks to minimize liquidity risk by increasing working capital. The result is that it forgoes the potentially higher returns available from using the additional working capital to acquire long-term assets.
 - 1) An **aggressive policy** reduces the current ratio (and liquidity) and accepts a higher risk of short-term cash flow problems in an effort to increase profitability.
 - 2) To maximize working capital, the firm should delay paying accounts payable and establish credit policies that encourage customers to pay collectibles quickly.
 - c. **Permanent working capital** is a concept reflecting the observation that a firm always maintains a minimum level of current assets. **Temporary working capital**, however, fluctuates seasonally.
 - 1) Hence, permanent working capital is akin to the firm's fixed assets and should increase as the firm grows. It differs in that the items included in working capital turn over relatively rapidly although their minimum total is maintained or increased over the long term.

8.2 CASH MANAGEMENT

- 1. **Cash management** is an integral part of financial management. In general, a company attempts to delay payments for purchases and accelerate collections on credit sales because the firm can then stretch its financial resources further.
- 2. In addition to maximizing the utility of cash, a company normally minimizes its liquid cash on hand because of the opportunity cost of holding rather than investing cash.
 - a. In Study Unit 10, we will explain in detail the reasons why a company attempts to minimize the amount of liquid cash. At this point, it is important to understand that a company typically only wants to have enough cash on hand to pay its obligations with a margin of safety.
- 3. The first step in managing a company's cash flows is the **cash budget**. It details projected receipts and disbursements, preferably with a view to planning the **synchronization of inflows and outflows**.
 - a. Cash receipts are based on projected sales and credit terms, estimated collection percentages, and estimated purchases and payment terms.
 - b. Projected cash outflows are based on the budgeted level of sales.

- c. Budgets must be for a specified period of time, and the units of time must be short enough to ensure that all cash payments can be made.
 - 1) The cash budget takes into account the **cash flow/cash conversion cycle**, which is the length of time from disbursement for inventory purchases to the receipt of cash from the sale of the inventory.
 - 2) While the budget is for a specific period of time, cash budgeting is an ongoing, cumulative activity that is re-evaluated constantly to ensure all objectives are being met.
 - d. The cash flow/cash conversion cycle is the length of time from when a company pays for inventory purchases to when it receives cash from the sale of the inventory.
 - 4. For a cash budget to be successful, a company needs to estimate how much cash it needs on hand. A company needs to maintain cash for the following reasons:
 - a. As a **medium of exchange**. Cash is still needed for some business transactions.
 - b. As a **precautionary measure**. Cash or a money-market fund can be held for emergencies. Normally, investment in high-grade, short-term securities is a better alternative to holding cash, but these securities are classified as cash under GAAP.
 - c. For **speculation**. Cash may be held to take advantage of bargain-purchase opportunities. However, for this purpose, short-term, highly liquid securities are preferable.
 - d. As a **compensating balance** in exchange for a bank's services or loans (see item 7. on the next page).
 - 5. The cash budget also examines **cash collections**. Sound financial management requires that cash collections be expedited.
 - a. Invoices should be mailed promptly.
 - b. Credit terms must be competitive but geared to encourage prompt payment.
 - 1) Cash discounts (sales discounts) are a means of accelerating cash collection by rewarding customers for early payment.
 - a) **EXAMPLE:** Items are commonly sold with terms of 2/10, n/30 (i.e., 2% discount if payment made within 10 days, entire balance due in 30 days).
 - c. A **lockbox system** may be used to expedite the receipt of funds. A firm maintains mailboxes, often in numerous locations around the country, to which customers send payments.
 - 1) A bank checks these mailboxes several times a day, and funds received are immediately deposited to the firm's account without first being processed by its accounting system. This practice hastens availability of the funds.
 - 2) In addition, having several lockboxes throughout the country reduces the time a payment is in the postal system.
 - d. **Transfer of monies by wire** expedites cash management. A **wire transfer** is any electronic funds transfer by means of a two-way system, for example, the Federal Reserve Wire Transfer System (Fedwire).
 - e. **Electronic funds transfer (EFT)** and customer debit cards expedite cash inflows. With the recent widespread growth of **electronic commerce** (the buying and selling of products and services over the Internet) by individuals, the use of EFT has mushroomed. Entities such as PayPal enable individuals to transfer funds to each other at little or no cost.
 - f. **Automated clearing house (ACH)** is an electronic network that facilitates the reading of data among banks.

- g. Under the **Check Clearing for the 21st Century Act**, financial institutions may convert paper checks to electronic images (**substitute checks** that are legal copies of the originals). The paper checks may then be destroyed.
- 1) The effect of the conversion will be to expedite check clearing. Consequently, cash collections and disbursements will be credited or debited, respectively, to the firm's accounts more quickly.
6. If the firm is able to slow cash disbursements without increasing costs, the firm can increase available cash on hand.
- a. Payment beyond normal credit terms, however, creates vendor ill will and may incur interest charges. If these interest charges are higher than alternative lending choices, this practice will not maximize shareholder wealth and should be avoided.
 - b. Payments should be made within **discount periods** if the cost of not taking a discount exceeds the firm's cost of capital. The cost of not taking a discount (not considering compounding effects) is approximately
 - 1)
$$\frac{360}{(\text{Total pay period} - \text{Discount period})} \times \frac{\text{Discount } \%}{(100\% - \text{Discount } \%)}$$
 - 2) For example, 2/10, net 30 results in the following calculation:

$$\frac{360}{30 - 10} \times \frac{2}{100 - 2} = \frac{360}{20} \times \frac{2}{98} = 36.7\% \text{ annualized interest}$$
 - c. Payment by **draft** (a three-party instrument in which the drawer orders the drawee to pay money to the payee) is a means of slowing cash outflows.
 - 1) A check is the most common draft. **Check float** arises from the delay between an expenditure or receipt by check and the clearing of the check.
 - a) The effect is an interest-free loan to the payor.
 - b) Accordingly, firms attempt to maximize **disbursements float** (the period from when checks are written to when they are deducted from the bank balance) and minimize **collections float**, which consists of the sum of the time checks are in the mail, internal processing time, and the time required for clearing through the banking system.
7. The cash budget also must take into account cash required to be kept on deposit with banks to satisfy compensating balances.
- a. A **compensating balance** is one required to be kept on deposit at a bank when a borrower executes a loan agreement.
 - b. Whenever compensating balances are negotiated, use of average rather than absolute compensating balances frees most of the compensating balance for use as a contingency fund.
 - 1) An average compensating balance provides a firm with **overdraft protection** for the days when cash demands are greatest and deposits fail to materialize. An absolute compensating balance is inflexible, establishing a minimum below which the balance cannot dip without penalty.
 - 2) The effective interest rate on loans requiring compensating balances equals total adjusted interest cost divided by total adjusted principal.
 - a)
$$\frac{\text{Total interest cost}}{\text{Total principal}}$$
 - b) Total principal is reduced by the account's ordinary balance, and total interest cost is reduced by the amount of interest that the company would earn on its ordinary balance.

8. Firms are also able to arrange **zero-balance checking accounts (ZBAs)**. These accounts allow the firm to slow disbursements and increase cash balances.
 - a. The account balance is maintained at zero until a check is presented. The resulting overdraft is covered by a transfer from a master (parent) account earning interest.
 - 1) The disadvantages are that the bank may charge a fee for this service and the amount needed in the master account still needs to be estimated.
9. The amount of **cash on hand** should be determined by cost-benefit analysis. Since the objective of financial management is to maximize shareholder wealth, minimizing the cost of holding cash and maximizing the returns on investing cash are paramount.
 - a. The reduction in average cash times the interest rate (cost of capital or investment yield rate) is the benefit.
 - b. Costs of having insufficient cash include incremental personnel cost, lost discounts, and lost vendor goodwill.
 - c. Whenever possible, a firm's excess cash should be placed in an investment with a high return and little risk.
 - d. A firm with excessive cash might tend to be an attractive takeover target.

8.3 MARKETABLE SECURITIES MANAGEMENT

1. Because firms seek investments with a high return and little risk, short-term marketable securities (e.g., T-bills and CDs) are sometimes held as substitutes for cash. They also can be held as temporary investments. Examples of short-term marketable securities are listed below.
 - a. **Treasury bills** are short-term government debt securities guaranteed explicitly by the U.S. government and exempt from state and local taxation. They are sold on a discount basis.
 - 1) **Default risk** is the possibility that a bond issuer will default on a payable. Government loans such as T-bills and Treasury notes are considered to have the least amount of risk because they are backed by the full faith and credit of the U.S. Federal government.
 - a) Obligations of federal agencies are not guaranteed by the U.S. government but only by the agency itself.
 - 2) **Event risk** is the risk that an unfavorable event (e.g., a leveraged buyout, recapitalization of company, or devaluation of a government's currency) will occur that increases default risk. Event risk is greater for long-term than for short-term securities.
 - b. **Certificates of deposit** are a form of savings deposit that cannot be withdrawn before maturity without a high penalty. However, negotiable CDs are traded under the regulation of the Federal Reserve System.
 - c. **Money-market accounts** are similar to checking accounts but pay higher interest.
 - d. **High-grade commercial paper** consists of unsecured, short-term notes issued by large companies that are very good credit risks. Commercial paper may yield a higher return than CDs. It is riskier because of a lack of FDIC insurance.

2. **Interest-rate risk** is the risk of interest rates changing after the purchase of a marketable security. This risk arises because interest rates greatly affect the price of securities. The reasons behind this are explained in more detail in Study Unit 10.
 - a. Therefore, interest-rate risk is minimized with short-term securities. Their shorter lives make them less subject to fluctuations in value from changes in the general level of interest rates.
3. **Changes in the general price level** (usually inflationary) alter the purchasing power of payments on investments (principal and interest). Therefore, the general price level affects the value of securities.
4. The degree of **marketability** of a security determines its **liquidity**, that is, the ability to resell at the quoted market price.
5. The firm's **tax position** is an important consideration. For example, a firm with net loss carryforwards may prefer a higher-yielding taxable security to a tax-exempt municipal bond.
6. Short-term marketable securities are usually chosen for reasons that make high-yield, high-risk investments unattractive. Hence, a higher return may be forgone in exchange for greater safety. Given the various options available, a company should have an **investment policy statement** to provide continuing guidance to management regarding the risk-return trade-off.
 - a. Given the various options available, a company should have an **investment policy statement** to provide continuing guidance to management regarding the risk-return trade-off.
 - b. Thus, speculative tactics such as **selling short** (borrowing and selling securities in the expectation that their price will decline by the time they must be replaced) and **margin trading** (borrowing from a broker to buy securities) are avoided.

8.4 RECEIVABLES MANAGEMENT

1. Sound financial management requires the firm to try and accelerate the payment of receivables. However, the discounts offered to encourage a prompt payment must not raise the firm's cost of capital.
2. Another **objective** of sound financial management concerning receivables management is having an optimal amount of receivables outstanding and the optimal amount of bad debts.
 - a. This balance requires a trade-off between the benefits of credit sales, such as higher revenue, and the costs of accounts receivable, e.g., collection, interest, and bad debt costs.
 - b. The **optimal credit policy** does not seek merely either to maximize sales (e.g., by lowering credit standards, offering longer discount periods, or charging lower interest) or to minimize default risk.
 - c. Thus, a firm should extend credit until the marginal benefit (profit) is zero (considering opportunity costs of alternative investments).
3. Credit terms, collection policies, etc., are frequently determined by **competitors**. A firm must match such inducements to make sales.
4. Firms often use a statistical technique called **credit scoring** to determine whether to extend credit to a specific customer.
 - a. Credit scoring assigns numerical values to the elements of credit worthiness, e.g., income, length of time employed in the same job, occupation, and home ownership.

5. Receivables management seeks to maximize the **accounts receivable turnover ratio**, that is, to shorten the average time receivables are held.
 - a. Accounts receivable turnover ratio = $\text{Net credit sales} \div \text{Average accounts receivable}$.
 - b. The average collection period is the average number of days it takes for a receivable to be collected.
 - c. A common analytical tool is an **aging schedule** developed from an accounts receivable ledger. It stratifies the accounts depending on time outstanding.
6. The following are different types of credit instruments used in receivables management:
 - a. An **invoice** is a bill issued by a firm that has provided goods or services to a customer. It includes the prices, terms, and types of goods. In asset-based lending (such as factoring), an invoice means an account receivable.
 - b. A **promissory note** is a two-party negotiable instrument that contains an unconditional promise to pay a fixed sum of money at a definite time.
 - c. A **conditional sales contract** is a financing method often used by sellers of equipment. The buyer receives possession and use of the goods. The seller initially receives a promissory note but retains title until the installment debt is paid. Retention of title facilitates repossession.
7. Other tools of credit such as bank charge cards should be evaluated as an alternative to charge accounts.
 - a. Banks charge a fee equal to 3% to 5% of charge sales.
 - b. Charge tickets can be deposited at a bank in the same way as customer checks and money is instantly available to the seller.

8.5 SHORT-TERM CREDIT

1. **Short-term credit** is debt scheduled to be repaid within 1 year. It often involves a lower interest rate and is more readily available than long-term credit.
 - a. Firms utilize short-term credit because often the cost of short-term financing (i.e., the interest rate) is less than the firm's cost of capital.
 - b. For example, it may be more advantageous for a firm to invest its cash in new machinery in Year 1 and borrow any necessary monies to satisfy working capital (e.g., the firm may need to pay a supplier for raw materials before the firm's customer pays for the manufactured widget) in Years 2, 3, etc. Thus, in this example, the new machine's benefits outweigh the cost of interest.
2. **Trade credit** is a type of short-term credit provided by suppliers. It is **spontaneous financing** because it arises automatically as part of the purchase transaction. The terms of payment are set by suppliers.
 - a. **Accrued expenses** are another source of spontaneous financing. Accruals such as salaries, wages, interest, dividends, and taxes also represent an interest-free method of financing because no interest accumulates until the due date; examples include payday for workers and the quarterly time set for payment of federal income taxes. Accruals have the additional advantage of fluctuating directly with operating activity, satisfying the matching principle.

3. **Commercial banks** offer many types of short-term credit, too. All of the types of short-term credit below will be shown on the balance sheet of the borrower as a note payable to the commercial bank lender.
- a. **Note maturity** is usually in less than a year, which requires the firm to roll over the debt frequently if needed. The **promissory note** states the terms of the loan and repayment policy.
 - b. **Compensating balances.** Banks may require a borrower to keep a certain percentage of the face amount of the loan in his/her account, which raises the real rate of interest to the borrower.
 - c. A **line of credit** is the maximum amount that a bank agrees to lend the borrower in a certain period.
 - 1) **EXAMPLE:** On January 1, a bank official tells Firm X that it may borrow up to \$100,000 in the coming year. A **revolving line of credit** allows the amount borrowed to be repaid and then borrowed again.
 - 2) A line of credit is the most practical form of financing for most small retail businesses.
 - d. **Letters of credit** are widely used in domestic and international trade and are intended primarily to facilitate the purchase and sale of goods. A letter of credit is a definite undertaking by an issuer (such as a bank) to a beneficiary (such as a seller) at the request of an applicant (such as a buyer who is a customer of the bank) to honor a presentation of documents by payment or delivery of an item of value. The function of the letter of credit is to finance the movement of goods in commerce and to ensure that the seller will be paid.
 - 1) A letter of credit is separate from the **underlying contract** between the applicant (buyer) and the beneficiary (seller). The issuer (bank) is required to look only to the terms of the letter of credit, not to the contractual obligations between the parties (buyer and seller).
 - 2) The issuer of a letter of credit is dealing in documents and not in contract performance. When the documents (a document of title, invoice, and insurance policy) are duly presented and comply with the conditions specified in the letter of credit, the issuer is obligated to pay the letter of credit.
 - a) The traditional letter of credit provides assurance to the seller of prompt payment upon compliance with the conditions specified in the letter of credit (typically, mere presentation of the documents). A letter of credit simply involves the exchange of documents and money through intermediaries with a better guarantee of payment than without the intermediaries.
 - 3) A nontraditional use of a letter of credit obligates the issuer to pay only in the event of **default** by the applicant. Such a use of a letter of credit is referred to as a **standby or guaranteed letter of credit**. Under a standby letter of credit, the issuer receives no documents of title, that is, nothing of value other than the promise by the applicant to reimburse the issuer for any expenditure made under the letter.

e. **Cost of Bank Loans**

1) **Regular (simple) interest** (principal and interest paid at maturity)

$$a) \frac{\text{Interest}}{\text{Borrowed amount}}$$

2) **Discounted interest** (interest paid in advance)

$$a) \frac{\text{Interest}}{\text{Borrowed amount} - \text{Interest}}$$

3) **Installment (add-on) interest** (principal plus interest equals the sum of installments)

$$a) \frac{\text{Interest}}{\text{Average borrowed amount}}$$

- f. The **prime interest rate** is the rate charged by commercial banks to their best (the largest and financially strongest) business customers. It is traditionally the lowest rate charged by banks.

4. **Commercial paper** consists of short-term, unsecured notes payable issued in large denominations (\$100,000 or more) by large corporations with high credit ratings to other corporations and institutional investors, such as pension funds, banks, and insurance companies. Maturities of commercial paper are at most 270 days. No general secondary market exists for commercial paper. Commercial paper is a lower-cost source of funds than bank loans. It is usually issued at below the prime rate.

a. Advantages

- 1) Provides broad and efficient distribution
- 2) Provides a great amount of funds (at a given cost)
- 3) Avoids costly financing arrangements

b. Disadvantages

- 1) Impersonal market
- 2) Total amount of funds available limited to the excess liquidity of big corporations

5. **Factoring.** A factor purchases accounts receivable and assumes the risk of collection. The firm involved receives money immediately to reinvest in new inventories. The financing cost is usually high – about two points or more above prime, plus a fee for collection.

- a. Credit cards act like factoring because the credit card company pays the store immediately, less approximately 2% of the charge. The credit card company then assumes the credit card user's debt, and the credit card holder pays the credit card company, not the store, for the purchase.
- b. A firm that uses a factor can eliminate its credit department and accounts receivable staff.
- c. Bad debts are eliminated.
- d. These reductions in costs can more than offset the fee charged by the factor.
- e. The factor can often operate more efficiently than its clients because of the specialized nature of its service.
- f. Before the advent of computers, factoring was often considered a last-resort source of financing, used only when bankruptcy was imminent. However, the factor's computerization of receivables means it can operate a receivables department more economically than most small manufacturers. Factoring is no longer viewed as an undesirable source of financing.

- g. **EXAMPLE:** A typical question concerns the cost to the firm of a proposed factoring agreement. Assume a factor charges (1) a 2% fee on the gross receivables submitted and (2) an interest rate of 18% on the amount accruing to the borrower after deducting (a) 10% of the gross receivables as a reserve against sales returns and allowances and (b) the 2% fee. The interest is paid in advance. If \$100,000 of receivables are submitted, and credit terms are net 60 days, what is the cost of this arrangement?

Amount of receivables submitted	\$100,000
Minus: 10% reserve	(10,000)
Minus: 2% factor's fee	(2,000)
Amount accruing to the firm	<u>\$ 88,000</u>
Minus: $[(\$88,000 \times 18\%) \div (60 \div 360 \text{ days})]$	(2,640)
Amount to be received immediately	<u><u>\$ 85,360</u></u>

- 1) The firm will also receive the \$10,000 reserve at the end of the 60-day period if it has not been absorbed by sales returns and allowances. Thus, the total cost to the firm to factor the receivables is \$4,640 (\$2,000 factor's fee + interest of \$2,640). Assuming that the factor has approved the customers' credit in advance, the seller will not absorb any bad debts.
- 2) The previously listed costs should be compared with the cost of operating a credit department, collection department, the cost of potential bad debt, and the cost of borrowing monies otherwise advanced by the factor. Sound financial management requires that the benefits outweigh the costs; therefore, if factoring is to be used, it should be more beneficial than having a credit department and accounts receivable staff.

6. Other Types of Short-Term Funding

- a. **Bankers' acceptances** are drafts drawn, by a nonfinancial firm, on deposits at a bank. The acceptance by the bank is a guarantee of payment at maturity. These are often used by importers and exporters and as a money-market fund investment.
- b. **Repurchase agreements** involve sales by a dealer in government securities who agrees to repurchase at a given time for a specific price. Maturities may be very short-term. This arrangement is essentially a secured loan.
- c. Loans secured by receivables (**pledging** receivables). A bank will often lend up to 80% of outstanding receivables.
- d. **Money-market mutual funds** invest in portfolios of short-term securities.
- e. **Warehouse financing** uses inventory as security for the loan. A third party, a public warehouse for example, holds the collateral and serves as the creditor's agent, and the creditor receives the **terminal warehouse receipts** evidencing its rights in the collateral. A **field warehouse** is established when the warehouser takes possession of the inventory on the debtor's property. The inventory is released (often from a fenced-in area) as needed for sale. Warehouse receipts may be negotiable or nonnegotiable. A nonnegotiable receipt is issued to a named party, e.g., the lender, and does not state that the goods are deliverable to bearer or to the order of a named person. A negotiable warehouse receipt meets all of the requirements of the Uniform Commercial Code for negotiability and is transferable by endorsement.
- f. **Trust receipts** are used in inventory financing. The creditor purchases and holds title to the inventory. The debtor is considered a trustee for purposes of selling the inventory and bears the risk of loss.
- g. **Agency securities** are issued by government agencies (not the Treasury), such as the Federal Home Loan Banks and other agencies that provide credit to farmers, home buyers, etc. An example is the Federal National Mortgage Association (Fannie Mae), which issues mortgage-backed securities. Agency securities may be long- or short-term.

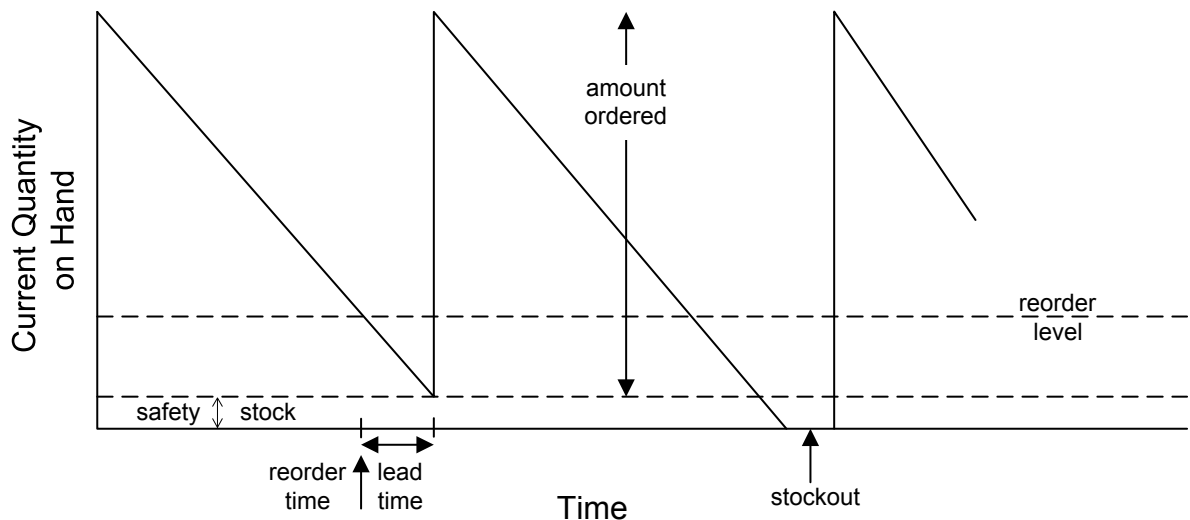
- h. **Treasury bills** are short-term U.S. government obligations issued by the Treasury at a discount from their face value. A T-bill is highly liquid and nearly free of risk, and it is often held as a cash substitute.
- i. **Treasury notes and bonds** are long-term investments, but issues near maturity are effectively short-term securities with high liquidity.
- j. **State and local governments** issue short-term securities exempt from taxation.
- k. **Eurodollars** are time deposits of U.S. dollars in banks located abroad.
- l. **Chattel mortgages** are loans secured by movable personal property (e.g., equipment or livestock).
- m. **Floating liens** attach to property, such as inventory, the composition of which is constantly changing.

8.6 INVENTORY AND SUPPLY CHAIN MANAGEMENT

1. Sound financial management treats **inventory management** similar to cash management. Therefore, the firm should attempt to minimize the costs associated with holding inventory.
 - a. A firm carries inventories because of the difficulty in predicting the amount, timing, and location of supply and demand. Thus, one purpose of **inventory control** is to determine the optimal level of inventory necessary to **minimize costs**.
 - b. Inventory management, which is a major component of financial management, concerns the effective and efficient acquisition, use, and distribution of inventory.
 - c. Although traditional inventory management minimizes inventory and the related holding costs, and modern just-in-time methods may seek to eliminate it altogether, some firms may still use inventory as a hedge against inflation as well as a guarantee of future availability.
2. One method of minimizing inventory costs is transferring them to suppliers or customers.
 - a. If a manufacturer knows exactly when materials will be needed, orders can be placed so that materials arrive no earlier than when they are required.
 - 1) This practice relies on a supplier who takes the responsibility for storing the needed inventory and shipping it to arrive on time.
 - 2) Suppliers are more willing to provide this service when they have many competitors.
 - b. Customers sometimes carry large quantities of inventory when given special quantity discounts or extended credit terms.
 - c. If customers are willing to accept long lead times, inventory can be manufactured to order, avoiding the need to store large quantities.
 - 1) Lead time is the amount of time between when the order for materials is placed and the materials are received.
 - d. Although these measures can reduce inventory carrying costs, additional costs might be incurred by adopting them. Shortage (stockout) costs may be incurred when an item is out of stock. These include the lost contribution margin on sales, customer ill will, and production interruptions.
 - e. Inventory policies should consider the types of costs and any limitations the firm may have, such as storage space.
 - 1) Constraints also may be imposed by suppliers.
 - 2) The cost of maintaining inventory records also should be considered.

3. Inventory and Ordering Terms

- a. **Ordering costs** include all costs of placing and receiving orders.
- b. **Carrying costs** include rent, insurance, taxes, security, depreciation, and opportunity cost (i.e., the cost incurred by investing in inventory rather than making an income-earning investment).
 - 1) Carrying costs also may include a charge for spoilage of perishable items or for obsolescence.
- c. **Reorder points, safety stock, and stockout cost**
 - 1) The cost of holding safety stock and the cost of stockouts should be minimized.
 - a) Safety stock is the amount of extra stock that is kept to guard against stockouts. It is the inventory level at the time of reordering minus the expected usage while the new goods are in transit.
 - b) The problem may be diagrammed as follows:



- i) The economic order quantity (EOQ) determines order size.
- ii) The reorder point is the intersection of the reorder level and the downward-sloping total inventory line that allows sufficient lead time for an order to be placed and received.
- c) The total expected cost of safety stock equals the sum of the expected annual stockout cost and the expected annual carrying cost. Annual expected stockout cost equals the cost per occurrence, times the probability of a stockout per cycle, times the number of cycles. Annual expected carrying cost of a safety stock equals the unit carrying cost times the number of units.

4. Economic Order Quantity (EOQ)

- a. **Inventory models** are quantitative models designed to control inventory costs by determining the optimal time to place an order (or begin production) and the optimal order quantity (production run).
 - 1) The timing of an order can be periodic (placing an order every X days) or perpetual (placing an order whenever the inventory declines to X units).
 - a) **Periodic order systems** place minimal emphasis on record keeping. However, a risk of substantial overstock or understock may arise unless inventories are checked for assurance that the model is still appropriate.

- b) **Perpetual systems** detect an inventory decline to the reorder point by entering every withdrawal on a perpetual record that shows the balance.
 - c) Physical inventories should be taken to reconcile records and verify models in either a periodic or a perpetual system.
- b. The **basic EOQ model** minimizes the sum of ordering (setup) and carrying costs.

- 1) The following are the characteristics of this model:
 - a) It is a periodic model.
 - b) Demand is known and uniform throughout the period.
 - c) The fixed costs of ordering are eliminated when the total cost equation is differentiated to arrive at the EOQ.
 - d) Cost per order (setup) and unit carrying cost are constant.
 - i) Thus, the model is based on variable costs.
 - e) Full replenishment occurs instantly when the last item is used, stockout costs are zero, and no safety stock is held.
- 2) The EOQ is the square root of (a) twice the periodic demand multiplied by the order (setup) cost (b) divided by the periodic unit carrying cost.

$$EOQ = \sqrt{\frac{2aD}{k}}$$

If: a = variable cost per order (setup)
 D = periodic demand in units
 k = unit periodic carrying cost

- 3) **EXAMPLE:** If periodic demand is uniform at 1,000 units, the cost to place an order is \$4, and the cost to carry one unit in inventory for a period is \$2, the EOQ is 63.25 units.

$$EOQ = \sqrt{\frac{2(\$4)(1,000)}{\$2}} = 63.25 \text{ units}$$

- 4) The **average level of inventory** for this model will be one-half of the EOQ. The formula shows that the EOQ varies directly with demand and order (setup) costs, but inversely with carrying costs. Therefore, if demand quadruples, the EOQ will only double because of the square root.
- 5) The EOQ results from differentiating the total cost with regard to order (production) quantity. The EOQ formula is the result of a differential equation. Therefore, it is based on variable costs. This means that order (setup) cost and unit carrying cost are in the equation, but all fixed costs are eliminated.
 - a) EOQ is the minimum point on the total cost curve. In terms of microeconomics (Study Unit 5), it can be conceptualized as the intersection of the variable carrying cost and the variable ordering cost curves.
- c. Variations of the EOQ model are numerous.
 - 1) The effects of quantity discounts can be considered by using trial and error. The optimal order quantity is the one giving the lowest periodic total cost.
 - 2) Lead time is accounted for by simply placing orders in advance. If back ordering is acceptable to customers, it can also be incorporated into the model.
 - 3) The limitations of the EOQ model are its restrictive assumptions, especially that of constant demand. But it can be combined with probability concepts to form an effective perpetual system.

5. One method available to minimize inventory costs, which helps maximize shareholder wealth, is the implementation of a **just-in-time (JIT) inventory model**. Firms have traditionally built parts and components for subsequent operations on a preset schedule. Such a schedule provides a cushion of inventory so that the next operation will always have parts to work with – a just-in-case method.
- a. In contrast, JIT limits output to the demand of the subsequent operation. Reductions in inventory levels result in less money invested in idle assets; reduction of storage space requirements; and lower inventory taxes, pilferage, and obsolescence risks.
 - 1) High inventory levels often mask production problems because defective parts can be overlooked when plenty of good parts are available. If only enough parts are made for the subsequent operation, however, any defects will immediately halt production.
 - 2) The focus of quality control under JIT shifts from the discovery of defective parts to the prevention of quality problems, so zero machine breakdowns (achieved through preventive maintenance) and zero defects are ultimate goals. Higher quality and lower inventory go together.
 - b. JIT is a reaction to the trends of global competition and rapid technological progress that have resulted in shorter product life-cycles and greater consumer demand for product diversity.
 - 1) Objectives are higher productivity, reduced order and carrying costs, faster and cheaper setups, shorter manufacturing cycle times, better due date performance, improved quality, and more flexible processes. The ultimate objectives are increased competitiveness and higher profits.
 - c. JIT systems are based on a manufacturing philosophy popularized by the Japanese that combines purchasing, production, and inventory control. Minimization of inventory is a goal because many inventory-related activities are viewed as nonvalue-added. Indeed, carrying inventory is regarded as a symptom of correctable problems, such as poor quality, long cycle times, and lack of coordination with suppliers.
 - d. However, JIT also encompasses changes in the production process itself. JIT is a pull system; items are pulled through production by current demand, not pushed through by anticipated demand. Thus, one operation produces only what is needed by the next operation, and components and raw materials arrive just in time to be used. To implement this approach and to eliminate waste of materials, labor, factory space, and machine usage, the factory is reorganized to permit what is often called lean production.
 - 1) Plant layout in a JIT-lean production environment is not arranged by functional department or process but by manufacturing cells (work cells). Cells are sets of machines, often grouped in semicircles, that produce a given product or product type.
 - a) Each worker in a cell must be able to operate all machines and perform support tasks, such as setup activities, preventive maintenance, movement of work-in-process within the cell, and quality inspection.
 - b) In contrast, in a pull system, workers might often be idle if they are not multi-skilled. On the other hand, JIT systems reduce or eliminate central support departments, space is saved, fewer and smaller factories may be required, and materials and tools are brought close to the point of use. Manufacturing cycle time and setup time are also reduced. As a result, on-time delivery performance and response to changes in markets are enhanced, and production of customized goods in small lots becomes feasible.

- c) A cellular organization requires workers to operate as effective teams, so employee empowerment is crucial in a JIT-lean production system. Greater participation by employees is needed to achieve continuous improvement and zero defects goals. They may have the power to stop production to correct a problem, be consulted about changes in processes, or become involved in hiring co-workers. Thus, managers in such a system usually play more of a facilitating role than a support role.
- e. The Japanese term **kanban** and JIT have often been confused. JIT is the total system of purchasing, production, and inventory control. Kanban is one of the many elements in the JIT system as it is used in Japan. Kanban means ticket. Tickets (also described as cards or markers) control the flow of production or parts so that they are produced or obtained in the needed amounts at the needed times.
 - 1) A basic kanban system includes a withdrawal kanban that states the quantity that a later process should withdraw from its predecessor and a production kanban that states the output of the preceding process. A vendor kanban tells a vendor what, how much, where, and when to deliver.
 - 2) Many firms have not been comfortable with controlling production using tickets on the production floor. Computerized information systems have been used for many years, and these firms have been reluctant to give up their computers in favor of the essentially manual kanban system. Instead, they have integrated their existing systems, which are complex computerized planning systems, with the JIT system.
- f. Another feature of the lower inventory levels in a JIT system is elimination of the need for several traditional internal controls. Frequent receipt of deliveries from suppliers often means less need for a sophisticated inventory control system and for control personnel.
 - 1) JIT also may eliminate central receiving areas, hard copy receiving reports, and storage areas. A central warehouse is not needed because deliveries are made by suppliers directly to the area of production.
 - 2) The quality of parts provided by suppliers is verified by use of statistical controls rather than inspection of incoming goods. Storage, counting, and inspecting are eliminated in an effort to perform only value-added work.
- g. In a JIT system, the dependability of suppliers is crucial. Firms that adopt JIT systems therefore develop close relationships with a few carefully chosen suppliers who are extensively involved in the buyer's processes.
 - 1) Long-term contracts are typically negotiated to reduce order costs. Indeed, some major retailers have agreed to continuous replenishment arrangements whereby a supplier with superior demand-forecasting ability essentially tells the buyer when and how much to reorder.
 - 2) Buyer-supplier relationships are further facilitated by electronic data interchange, a technology that allows the supplier access to the buyer's online inventory management system. Thus, electronic messages replace paper documents (purchase orders and sales invoices), and the production schedules and deliveries of the parties can be more readily coordinated.
- h. A concept closely related to JIT is **continuous replenishment of products (CRP)**. In a CRP system, such as Wal-Mart's, inventory management is the supplier's responsibility. When customers pay for goods at checkout, point-of-sale (POS) devices note bar codes and send automatic purchase orders to a central computer. The orders from all stores are then collected and retransmitted to the supplier. Thus, purchases are adjusted to demand with great speed.

6. **Increasing systems integration** has been the trend in inventory and manufacturing control.
- a. **Materials requirements planning (MRP)** was the earliest tool for inventory management. MRP is an integrated computer-based information system designed to plan and control raw materials used in a production setting.
 - 1) MRP is a **push-through system** because production is activated by forecasts of demand, not actual customer needs.
 - 2) MRP is also a **dependent-demand system**. It assumes that the forecasted demand for materials is typically dependent upon some other factor, which can be programmed into the computer, e.g., the demand for the completed product. The timing of deliveries is vital to avoid production delays.
 - a) **EXAMPLE:** An auto manufacturer need only tell a computer how many autos of each type are to be manufactured. The MRP system determines how many of every component part will be needed. The computer will generate a complete list of every part and component needed.
 - 3) MRP, in effect, creates schedules of when items of inventory will be needed in the production departments. If parts are not in stock, the computer will automatically generate a purchase order on the proper date (considering lead times) so that deliveries will arrive on time.
 - b. **Manufacturing resource planning (MRP II)** is a closed-loop computerized manufacturing system that integrates all facets of a manufacturing business, including production, sales, inventories, schedules, and cash flows.
 - 1) The same system is used for both financial reporting and management of operations (both use the same transactions and numbers).
 - 2) MRP II uses a **master production schedule (MPS)**, which is a statement of the anticipated manufacturing schedule for selected items for selected periods.
 - a) MRP also uses the MPS. Thus, MRP is a component of an MRP II system.
 - c. **Enterprise resource planning (ERP)** is the latest phase in the development of computerized systems for managing organizational resources. **ERP integrates information systems across the enterprise.**
 - 1) ERP **connects all operations** within the organization: personnel, financial accounting, production, marketing, distribution, etc.
 - 2) ERP also connects the organization with its **suppliers and customers**.