STUDY UNIT ONE

ETHICS

Ethics for Management Accountants

Global competition and economic uncertainty may pressure accounting and finance professionals to compromise ethical principles. A report released in May 2012 by the American Institute of Certified Public Accountants and the Chartered Institute of Management Accountants (UK) found a weakened "tone from the top" and more pressure on financial professionals, especially in emerging economies, to act unethically.

Certified Management Accountants are required to be committed to ethical behavior. The IMA's requirements for all members are stated in its *IMA Statement of Ethical Professional Practice*. The CMA exam not only tests the content of the *Statement* but also requires the candidate to determine the best resolution of ethical issues.

This study unit is the **first of two** on **professional ethics and risk management**. The relative weight assigned to this major topic in Part 2 of the exam is **25%** (15% for professional ethics and 10% for risk management). The two study units are

Study Unit 1: Ethics
Study Unit 2: Fraud and Risk Management

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

1.1 BUSINESS ETHICS

CMA candidates must be prepared to answer ethics questions that may be integrated with any of the other topics. Ethics may be tested in multiple-choice or essay sections. Ethics also may be tested at all three levels of difficulty. Accordingly, candidates must

1. Recall the streams of business ethics, the *IMA Statement of Ethical Professional Practice*, and anti-bribery laws such as the FCPA and UKBA and
2. Evaluate and apply the guidance for typical business situations.

In the essay format, these questions require the candidate to identify the nature of the ethical issue and how to resolve it. Understanding the differences between illegal and unethical behavior by an organization also is important.

1. Business Ethics

a. Business ethics, also known as corporate ethics, are the moral principles that guide business and decision making.

1) Business ethics applies to the behavior of organizations as a whole as well as the individuals within organizations.

2) It is possible to distinguish so-called “good” behavior and decisions from “bad” behavior and decisions or the “right” choice from the “wrong” choice. However, the definition of what is good and what is bad differs from one culture to the next.

3) It is relatively easy to define unethical behavior as being the “wrong” choice or the “bad” decision. Examples of unethical behavior are

a) Using child labor for production,
b) Discharging toxic substances into the environment, and
c) Paying kickbacks to customers to retain business.

4) Although unethical business decisions can often be defined, the situations are rarely as simple as in the examples above. Also, it can be difficult to determine what is, instead of the wrong decision, the exactly “right” decision. This determination is influenced by virtues and morals.

b. When analyzing ethical behavior, the following concepts should be recognized and understood:

1) **Ethics.** A philosophical examination and understanding of what is right and wrong, or good and bad.

2) **Morality.** Application of ethical principles.

3) **Virtue.** Characteristics of morality of an individual.

4) EXAMPLE: A manager who is personally and intrinsically involved with the environment always attempts to prevent the discharge of toxic substances even if doing so is not consistent with the overarching morality of the organization. This individual is a virtuous manager.

a) Alternatively, a manager who does not care about the environment, but knows that the organization does not want to pollute, is applying the ethical standards of the organization. This manager is moral but not, by definition, virtuous.

5) A virtuous manager does more than apply the organization’s ethical standards. Doing the right thing, but nothing more, is moral behavior. Going further and setting a personal standard and example is virtuous behavior.

c. Moral philosophy is the branch of philosophy that contemplates what is right and wrong. Moral philosophy consists of different concepts and streams of thought about how to perceive right and wrong. It provides the option to study the meaning and justification of moral claims for right and wrong.

d. Business decisions should be moral. However, different moral philosophies can be used to make those decisions. Moral philosophy can be divided into a few main streams related to business ethics:

1) **Teleology.** From this perspective, everything is a function of its end, purpose, or goal. The moral good is derived from what is achieved and whether the consequences of an action are considered “good.”

a) The teleological implication for business ethics is that the effects of decisions on multiple stakeholders should be taken into account.

2) **Utilitarianism.** This theory values maximizing positive effects, such as welfare or happiness. The morally right decision is the one that maximizes these positive effects. The general principle is that the "greatest happiness to the greatest number of people" is the measure for right or wrong decisions.
    a) Utilitarianism is a stream within teleological philosophy. The difference between teleology and utilitarianism is that the first focuses on the outcome in general. If the outcome achieved is good, the decision was morally good. The second focuses on the greater good for the greater number of people and is purely focused on an outcome in such terms as welfare and happiness.
3) **Deontology.** What is good or right is derived from the action itself regardless of the consequences.
    a) In deontology, a decision is right if it follows a moral rule or law even if the consequences of the decision are bad.
    b) Deontology and teleology are opposites.
4) **Virtue ethics.** A decision is right if a virtuous person would do the same in the same circumstances.
    a) Virtue ethics is focused on the individual, not the action itself (deontology) or the outcome (teleology). Thus, it considers the virtues of the individual carrying out the action. This action not only is judged as right or wrong but also guides the individual to the types of characteristics and behavior a "good" person would seek.
5) **Relativism.** Relativism (or moral relativism) claims that no universal set of moral principles exists.
    a) In relativism, a decision is right if it is based on what appears to be right or reasonable within one's own belief or value system.
    b) Therefore, judging others' decisions as wrong is difficult, because they can be right according to their own value systems.
    c) A common phrase from relativists is, "Who am I to judge?"
6) **Justice.** Every individual should be given what (s)he deserves.
    a) The most common interpretation of justice is that equals should be treated equally, and unequals should be treated unequally.
    b) EXAMPLE: The common view is that people who work more hours or in a more complex environment justifiably deserve higher pay. However, the less common view is that paying more or less based on age, gender, sexual orientation, race, or religion is justifiable.
    c) Justice is a broad term that could be used in different ways within society:
        i) **Social justice.** Everybody deserves equal economic, social, and political opportunities, irrespective of gender, race, religion, etc.
        ii) **Distributive justice.** Assets should be allocated equally within society.
        iii) **Restorative justice.** Those who have suffered unfairly can seek to be made whole.
        iv) **Retributive justice.** Those who have done wrong should be punished objectively and proportionally.

e. Besides the different streams of moral philosophy, business ethics includes certain concepts that can influence daily business.

1) **Fairness.** This concept is often used interchangeably with justice. However, while justice is seen as a standard of rightness, fairness emphasizes judging a decision without interference by one's opinion or personal feelings.

a) Within business ethics, fairness means applying the same rules, standards, or criteria in the same situations. A person's bias should be minimized when making decisions.

b) Fairness also is seen as leveling the playing field.

2) **Integrity.** An individual's internal compass that guides behavior. Integrity in the workplace means that a person does what (s)he says.

a) Within business ethics, one who acts with integrity upholds ethical standards and is incorruptible.

b) Often, core principles of integrity are virtue, compassion, honesty, loyalty, and objectivity.

3) **Due diligence.** A thorough evaluation of an organization or individual to assess potential risks.

a) Ethical due diligence should be considered by organizations. Without knowing business partners, an organization cannot uphold its own ethical standards.

4) **Fiduciary responsibility.** The legal responsibility to act solely for the best interests of another.

a) Not acting (solely) in the best interests of another party is a breach of ethics and does not uphold the ethical standards of an organization.

b) Decisions to act in another's best interests may be difficult and not beneficial to the organization or the individual called upon to act. But the moral and ethical standards should guide them to do so.

c) An example of fiduciary responsibility is the duty of a lawyer to act in the best interests of clients.

1.2 ETHICS FOR MANAGEMENT ACCOUNTANTS

1. *IMA Statement of Ethical Professional Practice*

a. The *Statement* contains four overarching principles:

1) Honesty
2) Fairness
3) Objectivity
4) Responsibility

b. The *Statement* also contains four specific standards:

1) Competence
2) Confidentiality
3) Integrity
4) Credibility

c. The final section, **Resolution of Ethical Issues**, is especially significant and has been tested on the exam many times.

1) One common question asks to whom an ethical challenge should be reported.
2) The IMA has an ethics helpline for members who wish to discuss ethical issues. The number is **800-245-1383**.

d. Adherence to these provisions is integral to achieving the objectives of management accounting.

1) Management accountants must not commit acts contrary to the *Statement* or condone the commission of such acts by others within their organization.

2. **Conflicts of Interest**

a. One of the provisions of the IMA *Statement* requires members to mitigate actual, and to avoid apparent, conflicts of interest.

1) A conflict of interest is a conflict between the personal and the official responsibilities of a person in a position of trust, sufficient to affect judgment, independence, or objectivity in conducting the affairs of the business.
2) Apparent conflicts are situations or relationships that reasonably could appear to other parties to involve a conflict of interest.

b. Examples of a conflict of interest include the following:

1) Having a substantial financial interest in a supplier, customer, or distributor
2) Using privileged information gained from one's official position to enter transactions for personal gain
3) A manager providing paid consultancy services to clients, suppliers, or other business partners of the company

c. Methods for control of a conflict of interest include the following:

1) Provide a code of conduct provision applying to conflicts of interest. The code of conduct should say that employees are to refrain from engaging in any activity that would prejudice their ability to carry out their duties ethically.
2) Require full financial disclosure by all managers.
3) Require prior notification of any transaction that may raise a question about a possible conflict of interest. The code should say that all parties should be notified of the potential conflict.
4) Prohibit financial ties to any supplier, customer, or distributor.
5) Encourage adherence to strong ethical behavior in corporate actions, policies, and public communications.
6) Employees should refuse any gift, favor, or hospitality that would influence or would appear to influence their actions.

3. **Ethics on the CMA Exam**

   a. CMA candidates essentially should memorize the *IMA Statement of Ethical Professional Practice* and be able to apply its provisions in evaluating and proposing resolutions for ethical issues, such as fraudulent reporting or manipulation of financial analyses, financial statement results, or budgets.

IMA STATEMENT OF ETHICAL PROFESSIONAL PRACTICE

Members of IMA shall behave ethically. A commitment to ethical professional practice includes overarching principles that express our values and standards that guide member conduct.

Principles

IMA's overarching ethical principles include: Honesty, Fairness, Objectivity, and Responsibility. Members shall act in accordance with these principles and shall encourage others within their organizations to adhere to them.

Standards

IMA members have a responsibility to comply with and uphold the standards of Competence, Confidentiality, Integrity, and Credibility. Failure to comply may result in disciplinary action.

I. COMPETENCE

1. Maintain an appropriate level of professional leadership and expertise by enhancing knowledge and skills.
2. Perform professional duties in accordance with relevant laws, regulations, and technical standards.
3. Provide decision support information and recommendations that are accurate, clear, concise, and timely. Recognize and help manage risk.

II. CONFIDENTIALITY

1. Keep information confidential except when disclosure is authorized or legally required.
2. Inform all relevant parties regarding appropriate use of confidential information. Monitor to ensure compliance.
3. Refrain from using confidential information for unethical or illegal advantage.

III. INTEGRITY

1. Mitigate actual conflicts of interest. Regularly communicate with business associates to avoid apparent conflicts of interest. Advise all parties of any potential conflicts of interest.
2. Refrain from engaging in any conduct that would prejudice carrying out duties ethically.
3. Abstain from engaging in or supporting any activity that might discredit the profession.
4. Contribute to a positive ethical culture and place integrity of the profession above personal interests.

IV. CREDIBILITY

1. Communicate information fairly and objectively.
2. Provide all relevant information that could reasonably be expected to influence an intended user's understanding of the reports, analyses, or recommendations.
3. Report any delays or deficiencies in information, timeliness, processing, or internal controls in conformance with organization policy and/or applicable law.
4. Communicate professional limitations or other constraints that would preclude responsible judgment or successful performance of an activity.

Resolving Ethical Issues

In applying the Standards of Ethical Professional Practice, the member may encounter unethical issues or behavior. In these situations, the member should not ignore them, but rather should actively seek resolution of the issue. In determining which steps to follow, the member should consider all risks involved and whether protections exist against retaliation.

When faced with unethical issues, the member should follow the established policies of his or her organization, including use of an anonymous reporting system if available.

If the organization does not have established policies, the member should consider the following courses of action:

- The resolution process could include a discussion with the member's immediate supervisor. If the supervisor appears to be involved, the issue could be presented to the next level of management.
- IMA offers an anonymous helpline that the member may call to request how key elements of the *IMA Statement of Ethical Professional Practice* could be applied to the ethical issue.
- The member should consider consulting his or her own attorney to learn of any legal obligations, rights, and risks concerning the issue.

If resolution efforts are not successful, the member may wish to consider disassociating from the organization.

b. CMA candidates should be able to apply the provisions of the *IMA Statement of Ethical Professional Practice* in recommending a course of action for management accountants to follow when confronted with an ethical dilemma in the business environment.

   1) Memorizing the "Resolving Ethical Issues" section of the *Statement* will enable the candidate to answer questions of this nature.

1.3 CORPORATE ETHICAL LEGISLATION

1. Anti-Bribery Laws

a. With businesses becoming more and more global, organizations are often moving into new territories. Globalization of business and accessing new markets raise issues regarding the perception of payments to officials or others.

1) As a result, more anti-bribery laws are being introduced by countries worldwide, and old laws are updated to meet current global standards. Anti-bribery laws are usually enacted because

a) Corruption is costly for companies, whether they are caught in the act (reputational damages) or the ones at a disadvantage;
b) Bribery has become more of an attention point within national jurisdictions;
c) Globalization requires more anti-bribery legislation; and
d) Enforcement of anti-bribery laws has become more international.

2) Almost all anti-bribery laws are similar. They usually concern offering, promising, giving, or authorizing the payment of money or anything of value

a) To other companies or government officials;
b) To influence an act or omission, or ensure any improper advantage; or
c) In order to obtain or retain business (advantages).

3) The purposes of anti-bribery and corruption laws are to

a) Prevent illegal practices,
b) Create a level playing field in international trade, and
c) Increase the quality of internal controls.

4) Bribery usually occurs in an international setting. Companies therefore should be aware of these laws no matter where they are located in the world. Most anti-bribery laws have strong extraterritorial jurisdiction, meaning that they can be enforced worldwide. Merely having an international employee could be enough to trigger the jurisdiction of an anti-bribery act.

5) Two of the main anti-bribery regimes worldwide are the U.S. Foreign Corrupt Practices Act (FCPA) and the U.K. Bribery Act (UKBA).

2. Foreign Corrupt Practices Act of 1977 (FCPA)

BACKGROUND 1-1 Foreign Corrupt Practices Act

During the Watergate investigations of 1973-74, it was discovered that U.S. companies were in the practice of paying government officials, politicians, and political parties in foreign countries.

The Securities and Exchange Commission (SEC) began its own investigation. Over 400 U.S. companies admitted paying out an estimated total of over $300 million from secret “slush funds.”

The Foreign Corrupt Practices Act (FCPA) was passed by Congress in 1977 in response to these discoveries.

a. The FCPA contains two sets of provisions:

1) Accounting

a) Books and Records

i) Issuers are required to make and keep books, records, and accounts that properly reflect transactions and dispositions of assets. The responsibility of the external auditor with respect to the act is to attest to the accuracy of the financial statements.

b) Internal Control

i) All issuers must devise and maintain a system of internal accounting control sufficient to ensure management's control, authority, and responsibility over assets, regardless of whether they have foreign operations.

ii) This provision has a particular impact on internal and external auditors. However, no one individual or position within a company is designated as being responsible for compliance. The company as a whole is responsible for adequate internal control.

2) Anti-Bribery

a) No concern or person subject to the FCPA's anti-bribery provisions may offer or authorize corrupt payments to any foreign official, foreign political party or official thereof, or candidate for political office in a foreign country.

b) Subject to the FCPA's anti-bribery provisions are

i) Domestic concerns, including any person acting on a concern's behalf, whether or not doing business overseas and whether or not registered with the SEC;

ii) Issuers, both U.S. and foreign companies, including any person acting on an issuer's behalf, that have a class of securities traded at a U.S. stock exchange or are otherwise required to file reports with the SEC; and

iii) Any person, including both concerns and individuals other than domestic concerns or issuers, and including foreign nationals and foreign non-issuing companies acting corruptly while in the U.S.

c) Note that only payments to foreign officials and politicians are prohibited; commercial bribery, such as payments to foreign business owners, corporate officers, or domestic U.S. officials, are not addressed by the FCPA.

d) The accounting and internal control provisions of the FCPA work hand-in-hand with the anti-bribery provision. A company with an adequate accounting system and internal controls should not be able to pay a bribe without reporting "Bribe Expense" on its income statement.

e) Financial institutions also must have controls to prevent money laundering and terrorist financing under the requirements of the FCPA.

b. **Corrupt payments** are payments intended to improperly influence the recipient to act or refrain from acting with the mere goal to obtain or retain business.

1) The FCPA prohibits a mere offer or promise of a bribe, even if it is not consummated.

a) The act prohibits payment of anything of value; however, de minimis gifts and tokens of hospitality are acceptable.

b) Passive bribery, i.e., receiving or accepting a bribe, is not prohibited by the FCPA.

2) Payments are prohibited if the person making them knew or should have known that some or all of them would be used to improperly influence a governmental official.

3) Individuals found in violation of the FCPA are subject to both fines and imprisonment. A corporation may be assessed a fine as well.

a) Fines imposed upon individuals may not be paid directly or indirectly by an employer.

c. **Facilitation payments.** Investigations that led to the passage of the FCPA found that some bribes had been distributed not to gain an unfair advantage but simply to be able to compete.

1) In some countries, government officials are expected to be paid by foreign companies just to perform the duties that would be considered a routine part of their job in the U.S.

2) Congress was convinced that not allowing these payments would put U.S. businesses at an international disadvantage. Thus, the FCPA contains a provision that allows these so-called facilitation payments.

3) The following are characteristics of facilitation payments:

a) They are paid to receive a product, service, license, etc., which is something the employee or company was already entitled to but did not receive without the extra payment.

b) Giving this product, service, or license is considered a routine part of the job of the official.

c) The payment is not absurdly high, although exact standards are not specified.

d) Facilitation payments should be accounted for in the books.

e) EXAMPLE: An employee has received all the necessary paperwork from the local government to offload cargo in a foreign port. The port master, however, refuses to allow offloading unless the company pays him $500. This payment should be considered a facilitation payment, as the company was already entitled to offload its cargo, and the port master should not have required the extra payment.

4) Although the provision of facilitation payments has generally been accepted, the UKBA (covered on the next page) does not permit them. Under the UKBA, even the smallest facilitation payments are prohibited, even if accounted for in the books.

5) Although facilitation payments are allowed under the FCPA, certain risks remain.

a) Certain legal issues can arise due to facilitation payments:

i) The lines between bribes and facilitation payments are blurred and often depend on the circumstances.

ii) Companies must define why and how a particular payment is a facilitation payment. If they cannot, they might be violating the law.

iii) The amount of the facilitation payment is not restricted. But the higher the payment, the higher the risk law enforcement sees it as a bribe.

iv) Although facilitation payments might be legal under the FCPA, if the company is doing business abroad, other jurisdictions might differ.

b) Also, certain other ethical issues arise:

i) The line between facilitation payments and actual bribery is unclear.

ii) Although facilitation payments are allowed to prevent unfair competition, they might inadvertently promote it. Smaller businesses are less likely to be able to make facilitation payments than large multinationals and are therefore at a disadvantage.

iii) Legal facilitation payments may conflict with the high ethical standards of the company.

EXAMPLE 1-1 FCPA Examples

Electronics company listed on the New York Stock Exchange

1. In 2013, the SEC charged a foreign electronics and healthcare company with FCPA violations related to improper payments made by employees of a Polish subsidiary to healthcare officials–qualifying as government officials–in Poland in order to ensure and quicken the sale of products. The company settled the charges with the SEC by paying more than $4.5 million.
2. Note that the foreign-based company could be charged by the SEC even though the bribery took place outside the U.S. and no U.S. citizens or concerns were involved. Just by being listed on a U.S. stock exchange, the company became subject to the FCPA.

Software executive

1. A former executive was charged in 2015 for violating the FCPA by bribing Panamanian government officials to ensure the sale of software licenses. The executive settled the case and agreed to return the received kickbacks with interest.
2. Note that not only companies are subject to the FCPA, but also people acting on behalf of the company.

3. **U.K. Bribery Act (UKBA) of 2010**

   a. A relatively new piece of legislation against bribery is the British UKBA. The UKBA recognizes four offenses:

      1) Offering, promising, or giving an advantage
      2) Requesting, agreeing to receive, or accepting an advantage
      3) Bribery of a foreign public official
      4) Failure by a commercial organization to prevent a bribe being paid to gain or retain business or a business advantage

   b. Compared to its U.S. counterpart, the FCPA, the UKBA is more strict and broadly applicable. The FCPA covers only bribery of foreign officials. But the UKBA also prohibits commercial bribery, passive bribery, and the failure to prevent bribery as a commercial organization.

   c. The UKBA is the anti-bribery law with the highest possible impact worldwide because it has the broadest extraterritorial jurisdiction. Companies, whether or not U.K.-based, should be aware of the territorial jurisdiction of the UKBA. The following are subject to the UKBA:

      1) U.K. companies doing business overseas. If an employee, agent, subsidiary, or service provider bribes someone overseas to obtain or retain business advantages, the company is liable under the UKBA.
      2) Foreign companies with operations in the U.K. Any company that carries on a part of its business within the U.K. is liable under the UKBA. How large this part must be is still unclear. Accordingly, companies are advised to act with caution because an agent or representative office in the U.K. probably would be sufficient.

   d. Individuals found in violation of the UKBA are subject to both fines and imprisonment. Fines can be imposed on organizations as well.

4. Sarbanes-Oxley Act of 2002 (SOX)

BACKGROUND 1-2 The Sarbanes-Oxley Act

In late 2001 and early 2002, business ethics were even more prevalent in the news than in the mid-1970s as a wave of improper practices came to light. The following table summarizes some of the more prominent ones:

Scandal Became Public	Company	Details	How Practices Came to Light
Oct 2001	Enron	Hid debt of over $1 billion in improper off-the-books partnerships	Whistleblower
Nov 2001	Arthur Andersen	Shredded documents related to audit of scandal-plagued client Enron	Enron investigation by SEC
Feb 2002	Global Crossing	Inflated revenues, shredded accounting-related documents	Whistleblower
Feb 2002	Qwest	Inflated revenues	Whistleblower
Mar 2002	WorldCom	Booked operating expenses as capital expenses; large off-the-books payments to founder	Internal audit
Apr 2002	Adelphia	Booked operating expenses as capital expenses; hid debt	Voluntary disclosure
Jun 2002	Xerox	Inflated revenues	Whistleblower

a. In response to the scandals described above, SOX imposed extensive new responsibilities on issuers of publicly traded securities and their auditors.

b. The most significant provision of SOX regarding ethics is Section 406(a), which requires any company issuing securities

> *. . . to disclose whether or not, and if not, the reason therefore, such issuer has adopted a **code of ethics for senior financial officers**, applicable to its principal financial officer and comptroller or principal accounting officer, or persons performing similar functions.*

c. Section 406(c) defines “code of ethics” as

> *. . . such standards as are reasonably necessary to promote (1) honest and ethical conduct, including the ethical handling of actual or apparent conflicts of interest between personal and professional relationships; (2) full, fair, accurate, timely, and understandable disclosure in the periodic reports required to be filed by the issuer; and (3) compliance with applicable governmental rules and regulations.*

d. Note that SOX does not define “ethics” itself; it simply takes an understanding of the concept for granted. This reflects the difficulty of legislating a sense of ethics.

1.4 CORPORATE RESPONSIBILITY FOR ETHICAL BEHAVIOR

1. **Factors Contributing to Ethical Behavior**

   a. Although it is never possible to completely eliminate the risks of individual behavior within the organization, it is the responsibility of the company to eliminate as much risk as possible.

   b. Understanding how several factors (beginning with item c. below) contribute to ethical conduct within the company is essential because high ethical values benefit the organization in the following ways:

      1) Creating a positive work environment
      2) Avoiding legal problems
      3) Improving brand reputation
      4) Enhancing customer loyalty
      5) Supporting employee satisfaction and meaning
      6) Satisfying the need to do the right thing

   c. **Code of Conduct.** All organizations should have a formal code of conduct. This document outlines specific behaviors that are required or prohibited within the organization.

      1) A code of conduct should be

         a) Readily accessible to all employees,
         b) Easy to understand,
         c) Relevant to the company and company-specific issues, and
         d) Supported by training and communication.

      2) By adopting a formal code of conduct, a company takes responsibility for the ethical behavior of its employees. Because all employees have notice of ethical standards and required behaviors, the ethical culture should be enhanced.

      3) A code of conduct that fulfills the stated requirements above and is part of the ethical culture equips employees to behave appropriately in complex situations.

   d. **Groupthink** is the phenomenon in which individuals become more loyal to the group than to making the best decision. Groupthink often produces more extreme decisions than would have been made by any individual in the group.

      1) Because individuals are not likely to disturb the harmony of the group, they may refrain from judging the group decision. In extreme cases, the individuals may not consider ethics or think critically. The result of achieving consensus therefore may lead to unethical decisions.

   e. **Diversity of thought** can improve adherence to ethical values. In more diverse groups, decisions tend to be less one-sided. These groups encourage individuals to participate, discuss ideas, and make fewer assumptions.

      1) Greater diversity should mean evaluation of more viewpoints and a higher probability that all relevant issues will be addressed.

      2) The effect should be fewer extreme decisions and more compliance with the ethical values of the company.

2. The IMA's Statement on Management Accounting, "Values and Ethics: From Inception to Practice," published in 2008, is a useful document for understanding ethical concepts in an organizational context. Quotations from this document are integrated into the outline on the following pages.

3. The **organization has a responsibility** to foster a sense of ethics in its employees and agents. All organizations need a code of conduct.

   If no defined code of conduct and ethical behavior is developed, employees will act on their own beliefs and values, or they will observe and emulate the behavior they see around them on a daily basis. . . .

   [O]rganizational behavior needs to be defined and deployed in a way that drives the individual behavior of employees in a manner consistent with defined expectations of the wider organization. (II. Introduction)

4. A pervasive sense of ethical values can **benefit an organization**.

   In the past, quality compliance and industrially-engineered output expectations helped exert a high level of control over direct-production employees . . .

   In today's service economy, control often involves developing management systems that include the flowcharting, mapping, and documentation of processes, activities, and tasks so that individuals know what to do "on the job." This works well when everything proceeds as anticipated, but what does an employee do when unplanned events occur? What reference does an individual look to for help in making decisions? To take a phrase from the pioneering work done in process management by Geary Rummler and Alan Brache (1995), what does one do "in the white spaces"? In most cases, an organization relies on the judgment of the individual and/or direct supervisor to develop a course of action that they feel represents the "policy" of the organization. This is why it is important to have a defined set of organizational values and code of ethics — they create the "touchstone" against which every unanticipated decision must be judged. Failure to have every individual in the organization know and understand these values and ethical code leads to inconsistency and, in the worst cases, unethical or fraudulent behavior. (IV. Values, Ethics, and Accounting)

5. A sense of ethics requires an ability to **distinguish between ethical and merely legal behavior**.

   Ethical behavior is not about abiding by the law. Individuals and organizations can act legally and still be acting unethically. Ethical behavior is driven by compliance with a set of values that acts as the touchstone for situational decisions where rules may not exist to cover every alternative. Ethics is about the integrity of the decision-making process that is used to resolve any number of issues. . . .

   Many individuals at the center of corporate scandals [of the late 20th and early 21st Century] have professed the belief that they were innocent of any wrongdoing, including Kenneth Lay of Enron or Conrad Black of Hollinger. The problem is that these individuals did not define their behavior by what most of society would see as "reasonable," but rather they followed their own particular code—in some cases, limiting the definition of ethical behavior to require compliance with the law and nothing more. When laws may have been broken, it falls to the courts to decide if an act was illegal and to assess penalties. In situations that may be unethical but are not illegal, however, there is no legal remedy. The only course of action for society is to either pressure the government to enact more rules or to decide not to do business or develop relationships with unethical companies and individuals. (II. Introduction)

6. **"Leadership by example,"** or "tone at the top," plays an important role in determining an organization's ethical environment.

   Ethical behavior is not something that applies to someone else — every single individual is responsible for behaving ethically. Nowhere is this more important than the demonstration of ethical behavior that managers and supervisors exhibit in the way they execute their day-to-day work . . .

   Many of us in today's workforce have seen organizations operating with a lack of ethical commitment. As a result, there often is a high level of skepticism toward what is said by those in management and leadership positions: People tend to believe what they see rather than what they are told in the company "pep talk." In order for a code of ethics to be effective, its application must be demonstrated by those in positions of power and leadership. Leaders must be seen living and managing by the code of ethics. (VI. Leadership by Example)

7. **The concept of "human capital"** is important to an organization in creating a climate where "doing the right thing" is expected.

   In most organizations today, labor costs constitute the majority of operating expenses. Efforts to reduce overhead have led to decentralization of operating decisions and the slimming down of supervision. The result is that employees cannot be watched and controlled in every aspect of their work, and an organization must, to a great degree, trust that its employees are acting in its best interests. Human "capital" is a critical asset. Humans create the innovation that generates new products or services and finds unique ways to undertake work in more cost-effective ways. They bring knowledge to the workplace and share it with coworkers. People develop relationships with each other and with suppliers, clients, and others on whom the organization depends. Top leadership in particular creates a climate and culture in which such productive applications of human skills can be optimized to the highest level. . . .

   If hiring decisions and employee orientation and training fail to address the alignment of individual values and ethics with organizational expectations, the result can be an equal, if not greater, negative impact on an organization's performance. Unmotivated employees can poison the atmosphere and reduce the teamwork and cooperation required for knowledge transfer and innovation, and they can have a significant negative impact on relationships with suppliers and customers.

   Understanding and acting on this aspect of human behavior has potential far beyond compliance with legal or regulatory requirements. Effective development and deployment of a values-based ethical culture becomes the cornerstone of an optimized and productive knowledge-based organization. (IV. Values, Ethics, and Accounting)

   An organizational code of ethics must therefore be used as a benchmark for hiring decisions. This ensures candidates have a personal code that aligns with the organizational expectations. (VI. Leadership by Example)

8. An **organization's culture** impacts its behavioral values.

   Every organization already has a culture. In smaller companies — particularly family-owned businesses — the culture reflects the personal values and business methods of the owners and primary operators. In larger companies, it is more difficult to convey the proper culture from the top. One of the most significant risks in very large organizations, in fact, is that the culture (and, by definition, the values and ethics) that the board of directors and senior management believe to exist within the company may be different from the actual culture experienced by employees, clients, and suppliers. In other words, upper management's perception of the culture is not reality. . . .

   Step one in establishing an ethical culture must be an assessment of the existing organizational values and culture and the development of a set of statements that define the principles the organization believes in and should act upon. These statements and principles can be developed by the shareholders, the board, or a governing body within the organization. (V. Defining and Developing the Organization's Behavioral Values)

9. **Employee training** is important to maintaining an ethical organizational culture.

   Although orientation must be provided to every employee at the time of hiring, it is not enough to maintain awareness and commitment to the application of a code of ethics in the workplace. Every existing member of staff should receive ongoing training, starting at the board level and cascading down throughout the organization . . . Ethics training for employees should focus on covering ethical concepts, the organization's code, and compliance. To achieve this, training should include:

   - *Ethical concepts and thinking: What is "behind" the issue of ethical action?*
   - *The organization's code of ethics and any supporting "rules"*

   (VIII. Practical Application: Converting Intent into Operational Reality)

10. **Two methods for monitoring** ethical compliance are

    a. **Human performance feedback loop**

       Performance review and development systems must be fully aligned with the requirements for ethical conduct. Competencies, job descriptions, and objectives should include ethical expectations, and the regular employee review systems (conducted on an annual basis at minimum) must assess employees against the same criteria. If the code of ethics dictates that employees treat all others with dignity and respect, then the review process must include 360° input — including both internal and external responses — in order to assess whether that is truly happening. Key Performance Indicators (KPIs) must include tracking of employees against ethical training requirements. Examples include:

       - *The number of new hires and percentage who completed orientation within required time frame*
       - *Percentage of employees who completed annual refresher training on ethical conduct*
       - *Number of employees scoring "achieved" and "exceeded" on annual reviews in ethics criteria*
       - *Number of employees given an award for noted ethical conduct*

       (IX. Measuring and Improving Ethical Compliance)

b. **Survey tools**

Ongoing surveys are very valuable tools for assessing ethical performance, especially in areas such as management and leadership. Surveys can be created using the organization's code of ethics and asking employees to rate how well the organization is following the contents. . .

Respondents can be asked to rate each statement on a scale of 1 through 5 or from "Strongly Disagree" to "Strongly Agree." The results become the basis for developing ongoing compliance indicators and can be used to stimulate dialogue with employees about their concerns and the possible courses of action that could be taken to improve ethical compliance. This turns the company into learning and developing organization. (IX. Measuring and Improving Ethical Compliance)

11. A **whistleblowing framework** (e.g., an ethics helpline) is an important component in maintaining an ethical organizational culture.

An effective feedback system includes having a confidential framework for employees to report possible violations of the organization's code of ethics and to receive advice on the ethical aspects of challenging decisions. Statistics show that a large number of occupational fraud cases are detected through an employee "hotline" or other reporting method . . .

Whichever approach an organization chooses, the collection, analysis, and summarization of ethics issues can provide insight into the operation of its code of ethics and the degree to which employees are following it. In addition, tracking and monitoring issues raised through a whistleblowing framework creates opportunities to enhance and improve internal controls. Management accountants need to ensure that such processes are in place, that they operate on a fully confidential basis, and that they are capable of generating statistical or event-based reporting through which insight into ethical practice can be created. (IX. Measuring and Improving Ethical Compliance)

a. SOX mandates that U.S. companies registered with the SEC have a whistleblowing hotline available.

12. Organizations face particular challenges in applying their values and ethical standards **internationally**.

When groups share the same cultural background, they tend to share the same values as well. Consequently, the basis for decision making and actions, including alignment with a code of ethical conduct, will be similar. When immigration combines groups from dissimilar countries or backgrounds, the impact can be significant, and the values and decision making processes may not be the same. It has nothing to do with a person being "good" or "bad," but rather is a matter of differing "norms" of behavior based on the society in which that person grew up. This situation is also observable when individuals go abroad to receive an education. . . .

The challenge of conflicting values becomes greatest in cases where a society has, for example, a limited separation of "state and religion." While most of the Western world professes to maintain a barrier between church and state, a number of countries in other parts of the world have a far greater integration of the two. In many cases, this creates national conflict when the two find themselves in disagreement on various issues.

All of these changes lead to a melting pot of personal values within societies and organizations, creating profound challenges for leaders and resulting in a new aspect of risk management for organizations. If organizations fail to make the effort to clearly define their expectations of ethical behavior and provide support and encouragement for complying with them, then the vacuum that is left will lead to unpredictable results. (II. Introduction)

13. A comprehensive framework of corporate **ethical behavior** is a prerequisite for an effective system of **internal control**.

    CEOs and CFOs have to place their own integrity on the line by attesting to compliance with an adequate level of internal controls (as well as all other certifications). Creating a thorough, integrated system for developing, implementing, sustaining, and monitoring ethical performance within the organization will allow executives to make such declarations with confidence that a code of ethics is the foundation of the organization's culture and is fully integrated into the thinking process of every employee and business partner. (IX. Measuring and Improving Ethical Compliance)

14. Ethical behaviors should consider the effects not only on clients, customers, and employees but also on society at large. For example, the natural environment, resource usage, the implications of outages, and means of waste disposal should all be addressed in an organization's code of conduct.

15. **Three tools** can be used to identify process controls related to ethical and behavioral issues:

    - ***Business Process Reengineering*** *(BPR), which became popular in the 1990s, provides a structured view of organizational processes and reveals the existence of tasks and activities that are carried out in order to transform inputs into outputs. At each task and activity level, there are potential risks that the management accountant will want to consider. In all cases, however, the behavioral aspects must provide a context for the risk and its control.*

    - ***Quality Management*** *provides another view of process management that can provide management accountants with an excellent variety of options that assist in creating greater visibility on process performance and risk. In fact, quality management and management accounting have much in common. The quality manager seeks to ensure that a process achieves "zero defects" by avoiding unplanned mistakes and costly rework. This includes ensuring that any potential risks that can lead to mistakes occurring or not being identified are assessed and evaluated — goals shared by management accountants . . .*

      Using this tool and considering risk from a behavioral aspect can assist in identifying what types of controls should be in place and where they would be best provided. Rather than relying on traditional accounting approaches such as control batch totals, authorization and security levels, etc., this approach uses the perspective of behavioral deviation from an anticipated norm.

    - ***Continual Process Improvement*** *(CPI) is the third area that can significantly contribute to identifying process controls related to ethical and behavioral issues. This concept relates to the development of a "learning organization" — where continual monitoring and assessment of process performance leads to the identification of potential process management and control issues . . . As an organization progresses — hiring new employees or adapting itself to competitive pressures — the business environment changes. These changes have the potential to make current internal controls ineffective or unacceptable. For example, as the workforce changes, the traditional reliance on the behavior of experienced staff may no longer be sufficient; new staff may not behave in a way that achieves the desired outcomes — especially if there is an inadequate approach to ethical hiring, leadership, and compliance. (VII. Ethics and Internal Controls)*

16. **Corporate Social Responsibility (CSR) and Sustainability**

a. Defining CSR and Sustainability

1) CSR, also known as corporate responsibility (CR), is the responsibility a company takes for having an impact on its stakeholders and society. A company can take responsibility for its impact by behaving ethically, legally, and transparently.

a) When applying CSR, a company focuses on maximizing its positive impact on its surrounding and minimizing its negative impact.

b) CSR can be accomplished through the core values of an organization or through philanthropic programs.

c) A CSR agenda is not something that should be done because it is legally required, but rather it should be deeply rooted within the company.

2) Sustainability focuses on the long-term vitality of the business, and, therefore, the position the business has to take within society and its environment to continue to operate.

a) The organization must take measures up front to ensure it can sustain itself in the future.

b) Measures typically include improving the business's social license to operate by, for example, building trust within local communities and showing dedication to mitigating environmental issues.

3) Companies often publish their results regarding CSR and sustainability issues either in separate CSR or sustainability reports online or by integrating this information into their annual report.

b. Major Issues Addressed by CSR and Sustainability

1) **Taxes.** A company should pay its fair share of taxes in order to contribute to the economic health of the country in which it operates.

2) **Environment.** A company should evaluate its impact on the environment and take measures to reduce that impact. For example, companies should seek to reduce pollution and avoid contributing to climate change.

3) **Human rights.** A company should be aware whether it is violating any human rights, directly or indirectly, and take measures to ensure human rights are respected through the whole value chain.

4) **Corruption.** A company should refrain from engaging in any corrupt activities, which are harmful to democratic values and fair competition.

c. Four Levels of CSR

1) Four levels of CSR have been defined to help guide organizations to strive for CSR. The four levels are best visualized as a pyramid, depicted in Figure 1-1 below.
2) **Economic responsibilities** form the base of the CSR pyramid. First and foremost, an organization should be economically viable and therefore profitable. Without a strong economic basis, a company cannot provide for the livelihood of its owners and employees or returns to its investors. Basically, a company should stay in business.
3) **Legal responsibilities** are the second level of CSR. Organizations should obey the law and operate according to the rule of law. Organizations should not ignore gray areas or use them to their advantage but should operate according to the spirit of the law.
4) **Ethical responsibilities** are the third level of CSR. Organizations should not merely fulfill legal obligations, but go above and beyond to do the right thing and avoid harming society, even if the law does not require it. This is the level at which managing CSR becomes complex, as acting ethically is not necessarily profitable, as required by the first level.
5) **Philanthropic responsibilities** form the top of the CSR pyramid. These responsibilities require organizations to give back to society in the form of money, goods, and social deeds as compensation for their harm to society (e.g., pollution).
6) Companies should strive to fulfill all levels of the pyramid, though balancing them can be complex when different interests clash. Economic responsibility can easily interfere with ethical responsibility, especially when the company faces a poor quarter. Additionally, society at large may not accept an organization's philanthropic actions at face value if it is not already acting legally and ethically in daily business.

Four Levels of Corporate Responsibilities, based on A.B. Carroll, 1991

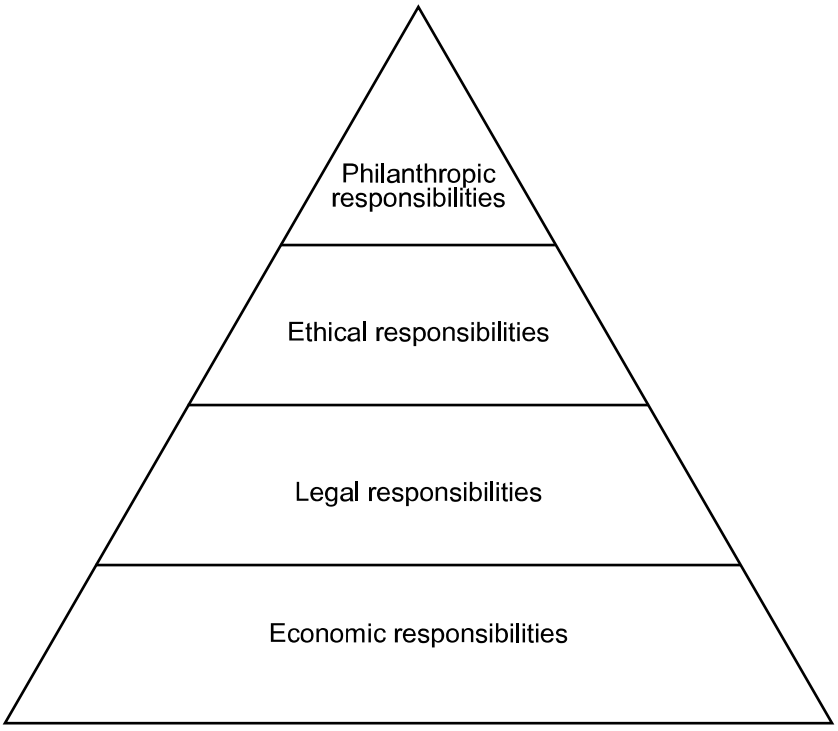


Figure 1-1

STUDY UNIT TWO

FRAUD AND RISK MANAGEMENT

This study unit is the **second of two** on **professional ethics and risk management**. The relative weight assigned to this major topic in Part 2 of the exam is **25%** (15% for professional ethics and 10% for risk management). The two study units are

Study Unit 1: Ethics
Study Unit 2: Fraud and Risk Management

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

2.1 FRAUD AND THE FRAUD RISK MODEL (FRAUD TRIANGLE)

1. **Types of Fraud**
   a. Fraudulent Financial Reporting
      1) Fraudulent financial reporting is most often committed **by management** to deceive financial statement users.
      2) It is the focus of external auditors and the concern of regulatory bodies, such as the Public Company Accounting Oversight Board and the SEC.
   b. Misappropriation of Assets
      1) Misappropriation of assets is most often committed **by employees** and results from theft, embezzlement, or defalcation.
      2) Although misappropriation of assets can cause the financial statements to be materially misstated, these frauds typically create internal problems rather than external ones.
         a) Once discovered, the effects of the material misappropriation of assets should be accounted for in the financial statements.
         b) Management is expected to create controls to mitigate exposure to this fraud and to deal effectively with it when discovered.

2. The Fraud Risk Model (Fraud Triangle)

a. The fraud triangle model recognizes three characteristics of fraud:

1) Opportunity
2) Rationalization
3) Pressure (motivation)

b. All three characteristics are hard to observe. Even if none of the three characteristics seem to be present in an organization, the risk of fraud cannot be completely eliminated.

1) The fraud triangle appears as follows:

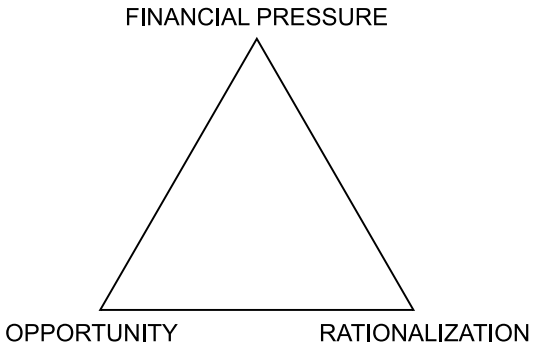


Figure 2-1

2) Some practitioners like to view the fraud model as a trio of overlapping circles, such as the following:

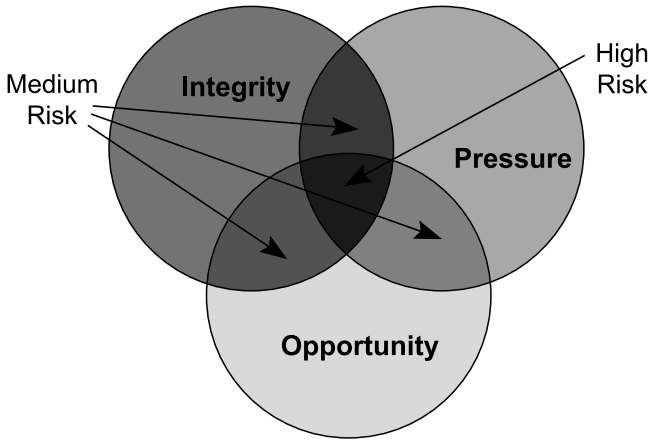


Figure 2-2

a) When all three characteristics are present, the risk of fraud is very high.

3) Characteristics may be present but hidden from the accountant. For example, financial pressure on an employee is not likely to be noticed by an auditor unless bill collectors are harassing the employee at the office.

c. **Opportunity** relates to the ability of a person not only to perpetrate but also to conceal fraud.

1) Opportunity is created by an absence of oversight, inadequate internal controls, or the lack of enforcement of those controls.

2) Opportunity is the **only** characteristic of fraud that can be controlled by management or the organization.

a) Management typically institutes internal controls to reduce opportunity, but breakdowns in internal controls do happen, or they are inadequate to mitigate risks.

d. **Rationalization** is a person's ability to justify actions as consistent with his or her personal code of ethics.

1) Levels of ethical principles and integrity vary greatly among individuals; thus, Certified Management Accountants should assume that anyone can justify the commission of fraud.

2) Various rationalizations that have been expressed by past perpetrators include the following:

a) Thoughts of being underpaid or overworked
b) Feeling that "everybody else is doing it"
c) Belief that rank in the company has its privileges
d) Low self-esteem or morale
e) A desire to seek revenge
f) Conviction that taking assets is only a loan and will be paid back
g) Assumption that nobody will get hurt

3) Rationalization is likely the most difficult characteristic to appraise.

a) It is difficult to gain insight into another person's ethical principles without intimate knowledge about the person.

b) Many frauds result from the belief by those in oversight positions that the perpetrator was honest.

4) Rationalization is dependent on a person's own ethical views. But the organization can try to influence this mindset. Methods include developing a strong ethical culture, issuing a code of conduct, and providing ethics education tailored to the organization's circumstances that includes real-world examples.

e. **Pressure (motivation)** is a person's reason or need for committing fraud.

1) Pressure for misappropriation of assets is typically motivated by the need for cash.

a) Few individuals are motivated to steal just to have the assets. A need or perceived need for cash creates the pressure to steal.

2) Although motives for fraudulent financial reporting often include the expectation of reward, the relationship between the fraud and the reward is not always so direct.

a) The expectation of reward may be other than monetary (e.g., continued employment, respect, or admiration).

b) When the reward is economic gain, managers may feel pressured to manipulate financial reporting if the managers' compensation is tied to financial results.

i) Other motivations include meeting debt covenants, budgets, or other financial goals.

ii) Probably the biggest motivation for management is to meet or exceed earnings targets.

iii) For larger public companies, the need to meet or exceed analysts' forecasts is a major motivator.

3) Organizations can seldom influence the pressure individuals experience to commit fraud.

a) In cases of overstating forecasts or results, an organization may reduce pressure to some extent by promoting and rewarding ethical behavior instead of emphasizing short-term financial goals and targets. This could take the pressure off managers to prioritize success. However, in most businesses, reward systems are still focused mostly on financial goals.

3. **Red Flags or Risk Factors Indicating Potential Fraud**
    a. Fraudulent Financial Reporting
        1) Performances too bad or too good to be true
        2) Threat of imminent bankruptcy, foreclosure, or hostile takeover
        3) High turnover of senior management, counsel, or board members
        4) Nonfinancial management's excessive participation in selecting accounting principles or determining estimates
        5) Strained relationship with the auditor
        6) Known history of securities laws violations
        7) Industry or market declines
        8) Poor cash flows
        9) Significant related party transactions not in the ordinary course of business
        10) Highly complex transactions
        11) Transactions in tax-haven jurisdictions
        12) Unrealistic sales or profitability incentives
        13) Unusually rapid growth
        14) Pressures to meet analysts' earnings expectations
    b. Misappropriation of Assets
        1) Missing documentation for transactions
        2) Large amounts of cash on hand
        3) High-valued, small-sized inventories or other assets
        4) Unexplained budget variances
        5) Failure of certain employees to take vacations
        6) Unusual write-offs of receivables
        7) Failure to follow up on past-due receivables
        8) Shortages in delivered or received goods
        9) Poor supervision
        10) Products or services purchased in excess of needs
        11) Payroll checks with a second endorsement
        12) Employees on the payroll who do not sign up for benefits
            a) Fictitious ("ghost") employees may be on the payroll. Employees who quit or are fired may not be removed from the payroll records by a supervisor who wants to keep their paychecks.
        13) Undocumented petty cash expenditures
        14) Common addresses on payables, refunds, or payments
        15) Addresses or telephone numbers of employees that match with suppliers or others
        16) Complaints by customers

4. **Investigative Resources and Techniques**
    a. Documents
        1) Documents provide a key source of evidence in most fraud investigations.
            a) The accountant should search the most likely locations and files for evidence-related documents and also should check other locations, such as trash bins, dumpsters, and shredders.
            b) The accountant should be alert for altered documents.
                i) An altered document often is evidence that fraud occurred.
            c) Documents can be altered in various ways, such as by erasure or forgery.
                i) Handwriting, particularly signatures, lends itself to identification. Handwriting examinations, which involve the comparison of known writing from a person with the questioned writing of another, can be used to detect forgeries. Experts will likely be needed to provide testimony.
                ii) Photocopies should be examined for authenticity of the original. Photocopies of supposed originals often can be recognized by the notation of “trash marks,” extraneous marks that appear on the copy.
                iii) Torn, smudged, faded, burned, etc., documents also should be examined for authenticity.
    b. Public Searches of Information
        1) Public records may be important in discovering the motives of, or the pressures on, a fraudster. Searches may uncover records for the following types of information:
            a) Civil and criminal actions
            b) Bankruptcy records
            c) Marriage licenses and divorces
            d) Property records
            e) Litigation history
        2) Social media is another potential source of information.
        3) Privacy concerns restrict the release of certain records by government and certain other organizations. These include the following:
            a) Medical records
            b) Banking records
            c) Trust records
            d) Telephone records
            e) Passenger lists
            f) Stock ownership
    c. Commercial Online Services
        1) Numerous commercial online services provide information about legal, financial, personal, and business activities for a fee.

d. Electronic Evidence

1) Accountants may need to consider electronic evidence; however, it is important to note that it may be difficult to determine who created it, and it is easily changed or deleted.

a) Erased files may be retrievable even when they appear to have been purged.

2) Considerations for electronic evidence include who created it, when it was created, who has the ability to change it, whether it has been changed since it was created, and how and where it is maintained and stored.

a) Documentation is often the key to answering these concerns and establishing credibility for evidence. Experts may be useful.

e. Interviews

1) An interview is one of the most efficient and useful evidence collection techniques.

2) An experienced interviewer can quickly gather information that might not be available in any other form.

3) In general, interviews should

a) Be of sufficient length and depth to uncover relevant facts
b) Exclude irrelevant or useless facts
c) Be objective and impartial
d) Be conducted on a timely basis
e) Allow flow of information from subject to interviewer, not vice versa

4) Determining whether a person is lying is difficult. However, although the signs are often unclear, those not telling the truth frequently exhibit physiological behaviors during the interview, such as

a) Shaking of the head rather than a verbal response
b) Responding to the interviewer with a question
c) Sweating
d) Denying an assertion while providing inconsistent nonverbal cues
e) Looking down rather than at the interviewer
f) Shifting and fidgeting
g) Delaying responses to questions

5) Care must always be taken when drawing conclusions from an interview concerning what is and is not truthful.

a) The stress of the interview or cultural differences could produce false positives.

f. Even the best investigative techniques are not always effective if a fraud is perpetrated by a conspiracy among a group of employees. A fraud perpetrated by a single individual is usually easier to uncover because of segregation of the duties.

2.2 MANAGING THE RISK OF FRAUD

1. A system of control is established to prevent fraud and error from occurring or at least to detect and correct issues as they happen.
    a. Internal controls are designed to, among other things, prevent or detect fraud. However, because of the concealment aspects of fraudulent activity, the controls cannot give absolute assurance that material fraud will be prevented or detected.
2. **Types of Controls**
    a. **Primary Controls**
        1) Preventive controls deter the occurrence of unwanted events.
            a) Storing petty cash in a locked safe and segregation of duties are examples of this type of control.
            b) IT examples include
                i) Designing a database so that users cannot enter a letter in the field that stores a Social Security number and
                ii) Requiring the number of invoices in a batch to be entered before processing begins.
        2) Detective controls alert the proper people after an unwanted event. They are effective when detection occurs before material harm occurs.
            a) For example, a batch of invoices submitted for processing may be rejected by the computer system. A detective control provides for automatic reporting of all rejected batches to the accounts payable department.
            b) Hash totals are commonly used to detect data entry errors but may also be used to test for completeness.
            c) A burglar alarm is another example.
        3) Corrective controls correct the negative effects of unwanted events.
            a) An example is a requirement that all cost variances over a certain amount be justified.
        4) Directive controls cause or encourage the occurrence of a desirable event.
            a) Policy and procedure manuals are common examples.
    b. **Secondary Controls**
        1) Compensatory (mitigative) controls may reduce risk when the primary controls are ineffective. However, they do not, by themselves, reduce risk to an acceptable level.
            a) An example is supervisory review when segregation of duties is not feasible.
        2) Complementary controls work with other controls to reduce risk to an acceptable level.
            a) For example, separating the functions of accounting for and custody of cash receipts is complemented by obtaining deposit slips validated by the bank.

3. **Segregation of Duties**
    a. The **segregation of accounting duties** can enhance systems security.
        1) Segregation of duties involves the separation of the functions of authorization, recordkeeping, and asset custody so as to minimize the opportunities for a person to perpetrate and conceal errors or fraud in the normal course of his or her duties.
    b. Compensating controls replace normal controls, such as segregation of duties when the latter cannot be feasibly implemented.
4. **Independent Checks and Verification**
    a. At a certain point in the control process, a reconciliation between recorded amounts and assets must be performed by a part of the organization that is either (1) unconnected with the original transaction or (2) without custody of the assets involved.
        1) A comparison revealing that assets do not agree with recorded amounts should be investigated, as it could indicate fraud or error.
            a) Inquiries should be made into the cause of the discrepancy, and appropriate action should be taken.
        2) The frequency of such comparisons for the purpose of safeguarding assets depends on the nature and amount of the assets involved and the cost of making the comparison.
            a) The costs should not outweigh the benefits.
    b. Prenumbered forms can assist in reconciliation because it is easier to establish a complete record of prenumbered forms, which can then all be reconciled.
5. **Safeguarding Controls**
    a. Safeguarding controls limit access of an organization's assets to authorized personnel, including both physical access and access to documents and records.
        1) An example is a lockbox system.

2.3 RISK MANAGEMENT

1. The Evolution of Risk Management

a. In previous decades, businesses addressed risk management with a fragmented approach. The IMA's Statement on Management Accounting, "Enterprise Risk Management: Frameworks, Elements, and Integration," describes it this way:

. . . the treasury function focused on risks emanating from foreign currencies, interest rates, and commodities--so called financial risks. An organization's insurance group focused on hazard risks such as fire and accidents. Operating management looked after various operational risks, and the information technology group was concerned with security and systems risks. The accounting and internal audit function focused on risks caused by inadequate internal controls and trends in performance indicators. The general assumption was that executive management had its eye on the big picture of strategic risks facing the enterprise in the short term and over the life of the strategic plan.

b. This fragmented approach to risk management is unsuitable to the complex and interconnected business environment of the 21st century. The concept of enterprise risk management (ERM) arose to address the current need.

c. ERM approaches risk from an enterprise-wide perspective. Its goal is

. . . to create, protect, and enhance shareholder value by managing the uncertainties that could either negatively or positively influence achievement of the organization's objectives.

2. Five Types of Risk

a. **Hazard risks** are insurable risks. Examples include natural disasters, the incapacity or death of senior officers, sabotage, impairment of physical assets, and terrorism.

b. **Financial risks** encompass interest-rate risk, exchange-rate risk, commodity risk, credit risk, liquidity risk, and market risk.

c. **Operational risks** are related to the enterprise's ongoing, everyday operations. Operational risk is the risk of loss from inadequate or failed internal processes, people, and systems.

1) These failures can relate to human resources (e.g., inadequate hiring or training practices), business processes (poor internal controls), technology, product failure (customer ill will, lawsuits), occupational safety and health incidents, environmental damage, and business continuity (power outages, natural disasters).

2) Operational risk includes legal risk (making the enterprise subject to civil or criminal penalties) and compliance risk (the risk that processes will not be carried out in accordance with best practices).

3) Operational risk can be managed with adequate internal controls, business process reengineering, and business continuity planning.

d. **Strategic risks** include global economic risk, political risk (governments will change rules), regulatory risk, and risks related to global market conditions. Also included are reputation risk, leadership risk, brand risk, and changing customer needs.

e. **Business risk** is the risk that a company will have lower than anticipated profits or will incur a loss.

3. **Volatility and Time**

   a. Any time uncertainty increases, risk increases. Thus, as the volatility or duration of a project or investment increases, so does the associated risk.

4. **Key Steps in the Risk Management Process**

   a. **Step 1 – Identify risks.** Every risk that could affect the achievement of the organization's objectives must be considered. Note that this does not mean every single risk that is possible, only those that have could have an impact on the organization.

      1) Risk identification must be performed for the entire organization, down to its lowest operating units. Some occurrences may be inconsequential for the enterprise as a whole but disastrous for an individual unit.

   b. **Step 2 – Assess risks.** Every risk identified must be assessed as to its probability and potential impact (item 5.a. on the next page).

      1) Quantitative risk assessment techniques include benchmarking and scenario analysis (i.e., evaluating the effect of changes to assumptions).

      2) Not all assessments need to be made in quantitative terms. Qualitative terms (e.g., high, medium, low) are often useful.

   c. **Step 3 – Prioritize risks.** In large and/or complex organizations, top management may appoint an ERM committee to review the risks identified by the various operating units and create a coherent response plan.

      1) The committee must include persons who are competent to make these judgments and are in a position to allocate the resources for adequate risk response (i.e., chief operating officer, chief audit officer, chief information officer).

   d. **Step 4 – Formulate risk responses.** The ERM committee proposes adequate response strategies (item 7. on the next page).

      1) Personnel at all levels of the organization must be made aware of the importance of the risk response appropriate to their levels.

   e. **Step 5 – Monitor risk responses.** The two most important sources of information for ongoing assessments of the adequacy of risk responses (and the changing nature of the risks themselves) are

      1) Those closest to the activities themselves. The manager of an operating unit is in the best position to monitor the effects of the chosen risk response strategies.

      2) The audit function. Operating managers may not always be objective about the risks facing their units, especially if they had a stake in designing a particular response strategy. Analyzing risks and responses are among the normal duties of internal auditors.

5. **Probabilities of Risk Exposures**

   a. Risk can be quantified as a combination of two factors: the severity of consequences and the likelihood of occurrence. The expected value of a loss due to a risk exposure can thus be stated numerically as the product of the two factors.

EXAMPLE 2-1 Expected Value of a Loss

A company is assessing the risks of its systems being penetrated by hackers.

Event	Potential Monetary Loss		Likelihood		Expected Loss
Minor penetration	$ 1,000,000	×	95%	=	$ 950,000
Unauthorized viewing of internal databases	50,000,000	×	35%	=	17,500,000
Unauthorized alteration of internal databases	2,000,000,000	×	1%	=	20,000,000

The company considers it almost inevitable that a minor penetration of its systems will take place. However, the expected monetary loss is sustainable.

By contrast, the other two events are much less likely but would have a disastrous impact on the firm.

Obviously, neither the probabilities nor the dollar amounts in an expected loss calculation are precise. If a disastrous penetration of the company's systems did occur, it might induce a loss of more than $2 billion.

   1) The **unexpected loss or maximum possible loss** is the amount of potential loss that exceeds the expected amount.

6. **Risk Appetite**

   a. The degree of willingness of upper management to accept risk is termed the organization's risk appetite.

      1) If top management has a low appetite for risk, the risk response strategies adopted will be quite different from those of an organization whose management is willing to accept a high level of risk.

7. **Strategies for Risk Response**

   a. **Risk avoidance** ends the activity from which the risk arises. For instance, the risk of having a pipeline sabotaged in an unstable region can be avoided by simply selling the pipeline.

   b. **Risk retention** is the organization's acceptance of the risk of an activity. This term is becoming synonymous with the phrase "self insurance."

   c. **Risk reduction** (mitigation) is the act of lowering the level of risk associated with an activity. For instance, the risk of systems penetration can be reduced by maintaining a robust information security function within the organization.

   d. **Risk sharing** transfers some loss potential to another party. Common examples are the purchase of insurance policies, engaging in hedging operations (covered in item 12. beginning on the following page), outsourcing an activity, and entering into joint ventures. It is synonymous with risk transfer.

   e. **Risk exploitation** is the deliberate courting of risk in order to pursue a high return on investment. Examples include the wave of Internet-only businesses that crested in the late 1990s and cutting-edge technologies, such as genetic engineering.

8. **Cost-Benefit Analysis**
    a. In deciding among risk responses, management must consider the costs and benefits of each risk response. A risk response should be ignored if its costs exceed its benefits.
    b. The costs associated with a risk response include both direct and indirect costs. Such costs include the costs incurred to design, implement, and maintain the risk response. Management should also consider the opportunity costs associated with each risk response.
    c. The costs and related benefits of each risk response can be measured quantitatively or qualitatively.
9. **Residual Risk vs. Inherent Risk**
    a. Residual risk is the risk of an activity remaining after the effects of any risk responses.
    b. Inherent risk is the risk of an activity that arises from the activity itself. For example, uranium prospecting is inherently riskier than retailing.
10. **Benefits of Risk Management**
    a. Efficient use of resources. Only after risks are identified can resources be directed toward those with the greatest exposure.
    b. Fewer surprises. After a comprehensive, organization-wide risk assessment has been performed, the odds that an incident that has never been considered will arise are greatly reduced.
    c. Reassuring investors. Corporations with strong risk management functions will probably have a lower cost of capital.
11. **Liability and Hazard Insurance**
    a. An insurance policy is a contract that shifts the risk of financial loss caused by certain specified occurrences from the insured to the insurer in exchange for a periodic payment called a premium.
        1) Liability insurance provides an organization with financial protection against damage caused to consumers by faulty products or injury to persons suffered on the organization's premises.
        2) Hazard insurance is the same as homeowner's or automobile driver's insurance. It protects the organization against damage caused to its facilities by accident or natural disaster.
12. **Financial Risk Management Methods**
    a. An extremely common form of financial risk management is called hedging. **Hedging** is the process of using offsetting commitments to minimize or avoid the impact of adverse price movements.
        1) A person who would like to sell an asset in the future has a long position in the asset because (s)he benefits from a rise in value of the asset. To protect against a decline in value, the owner can enter into a short hedge, i.e., obtain an instrument whose value will rise if the asset's value falls.
        2) A person who would like to buy an asset in the future has a short position in the asset because (s)he benefits from a fall in value of the asset. To protect against a rise in value, the party can enter into a long hedge, i.e., obtain an instrument whose value will rise if the asset's value rises.
        3) Instruments for hedging include options, futures contracts, and swaps.

b. Financial risk can also be addressed through more conventional methods.

1) For instance, an organization can lower the risk that it will be unable to meet maturing bond obligations by establishing a sinking fund.

2) Similarly, the risk of being unable to meet maturing short-term obligations can be mitigated. The establishment of policies regarding the terms of short-term investment instruments can ensure that funds will be available when they are needed (a practice called maturity matching).

13. **Qualitative Risk Assessment Tools**

a. Precise numeric quantification of risk is not necessarily required to have a sound risk management structure (quantitative risk assessment tools are covered in Study Unit 5, Subunit 4). Qualitative tools are crucial for upper and operational management to describe the risks they face.

1) Risk identification, the very first step in the process, does not lend itself to quantitative techniques. Intuitive and thought-provoking methods are required to identify all the areas of organizational vulnerability.

a) The first round of risk identifications can begin with a simple question to management at all levels: What aspects of the organization keep you up at night?

b) A list of generic risk areas can be distributed to inspire managers about possible points of vulnerability in their domains (foreign exchange risk, supply chain risk, regulatory risk, competitive risk, computer hacker risk, etc.).

c) A brainstorming session among managers is a simple technique to start the risk identification process.

2) Risk ranking is also necessarily an intuitive process. Managers have a “feel” for how much risk a given vulnerability presents to their domains.

3) **Risk mapping** is a visual tool for depicting relative risks. The probabilities of the identified events can be graphed on one axis and the severity of the consequences on the other.

2.4 COSO ENTERPRISE RISK MANAGEMENT (ERM) FRAMEWORK

1. COSO Risk Management Framework

a. *Enterprise Risk Management – Integrating with Strategy and Performance* (COSO ERM framework) is a framework that complements, and incorporates some concepts of, the COSO internal control framework.

b. The COSO ERM framework provides a basis for coordinating and integrating all of an organization's risk management activities. Effective integration

1) Improves **decision making** and
2) Enhances **performance**.

2. ERM Definition and Concepts

a. ERM is based on the premise that every organization exists to provide **value** for its stakeholders. Accordingly, ERM is defined as

*The culture, capabilities, and practices, integrated with strategy-setting and performance, that organizations rely on to **manage risk** in creating, preserving, and realizing **value**.* [emphasis added]

b. Key concepts and phrases

1) **Culture** consists of "[t]he attitudes, behaviors, and understanding **about risk**, both positive and negative, that influence the decisions of management and personnel and reflect the mission, vision, and core values of the organization." [emphasis added]

a) **Mission** is the organization's core purpose.
b) **Vision** is the organization's aspirations for what it intends to achieve over time.
c) **Core values** are the organization's essential beliefs about what is acceptable or unacceptable.

2) **Capabilities** are the skills needed to carry out the entity's mission and vision.

3) **Practices** are the collective methods used to manage risk.

4) **Integrating strategy setting and performance.**

a) Risk must be considered in setting strategy, business objectives, performance targets, and tolerance.

i) **Strategy** communicates how the organization will (a) achieve its mission and vision and (b) apply its core values.

ii) **Business objectives** are the steps taken to achieve the strategy.

iii) **Tolerance** is the range of acceptable variation in performance results. (This term is identical to "risk tolerance" in the COSO internal control framework.)

b) The organization considers the effect of strategy on its risk profile and portfolio view.

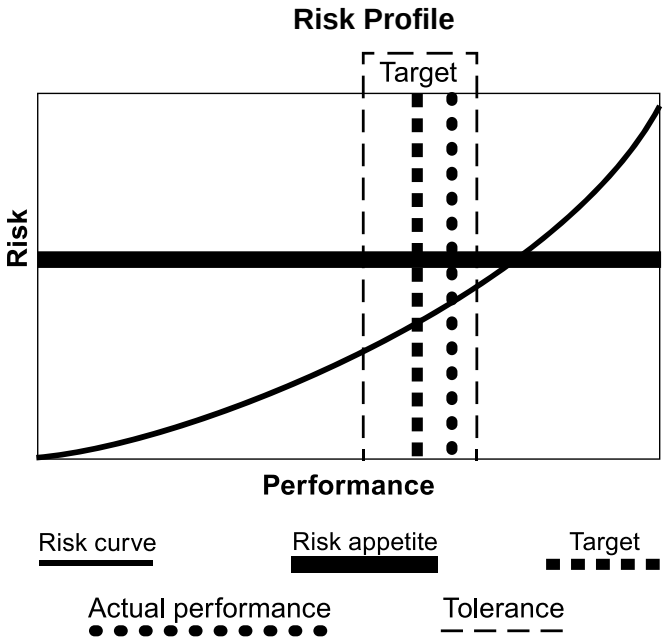


Figure 2-3

i) **Risk profile** is a composite view of the types, severity, and interdependencies of **risks** related to a specific strategy or business objective and their effect on **performance**. A risk profile may be created at any level (e.g., entity, division, operating unit, or function) or aspect (e.g., product, service, or geography) of the organization.

ii) **Portfolio view** is similar to a risk profile. The difference is that it is a composite view of the risks related to **entity-wide** strategy and business objectives and their effects on **entity** performance.

5) **Managing risk**

a) **Risk** is "[t]he possibility that events will occur and affect the achievement of strategy and business objectives."

b) **Opportunity** is any action or potential action that creates or alters goals or approaches for the creation, preservation, or realization of value.

c) Effective ERM practices provide **reasonable expectation** (not absolute assurance) that the risk assumed is appropriate.

d) **Risk inventory** consists of all identified risks that affect strategy and business objectives.

e) **Risk capacity** is the maximum amount of risk the organization can assume.

f) **Risk appetite** consists of the amount and types of risk the organization is willing to accept in pursuit of value.

g) **Inherent risk** is the risk in the absence of management actions to alter its severity.

i) **Actual residual risk** remains after management actions to alter its severity.

h) **Risk response** is an action taken to bring identified risks within the organization's risk appetite.

i) A **residual risk profile** includes risk responses.

i) **Target residual risk** is the risk the entity prefers to assume knowing that management has acted or will act to alter its severity.

6) **Value** is

a) **Created** when the benefits obtained from the resources used exceed their costs.

b) **Preserved** when the value of resources used is sustained.

c) **Realized** when benefits are transferred to stakeholders.

d) **Eroded** when management's strategy does not produce expected results or management does not perform day-to-day tasks.

3. **ERM Roles and Responsibilities**

   a. The **board** provides risk oversight of ERM culture, capabilities, and practices. Certain board committees may be formed for this purpose. Examples are

      1) An **audit** committee (often required by regulators),
      2) A **risk** committee that directly oversees ERM,
      3) An **executive compensation** committee, and
      4) A **nomination or governance** committee that oversees selection of directors and executives.

   b. **Management** has **overall responsibility** for ERM and is generally responsible for the **day-to-day** managing of risk, including the implementation and development of the COSO ERM framework. Department-level risks are best addressed by a manager within the affected department.

      1) Within management, the **CEO** has **ultimate responsibility** for ERM and achievement of strategy and business objectives. The risk manager should also have "dotted line" reporting access to the board of directors.

   c. An organization may designate a **risk officer** as a centralized coordinating point to facilitate risk management across the entire enterprise.

   d. **Three lines of management accountability**

      1) The first line consists of the principal owners of risk. They manage performance and risks taken to achieve strategy and objectives.
      2) The second line consists of the supporting (business-enabling) functions (e.g., risk officer) that (a) provide guidance on performance and ERM requirements, (b) evaluate adherence to standards, and (c) challenge the first line to take prudent risks.
      3) The third line (assurance) (e.g., internal auditing) (a) audits (reviews) ERM, (b) identifies issues and improvements, and (c) informs the board and executives of matters needing resolution.

4. **ERM Components**

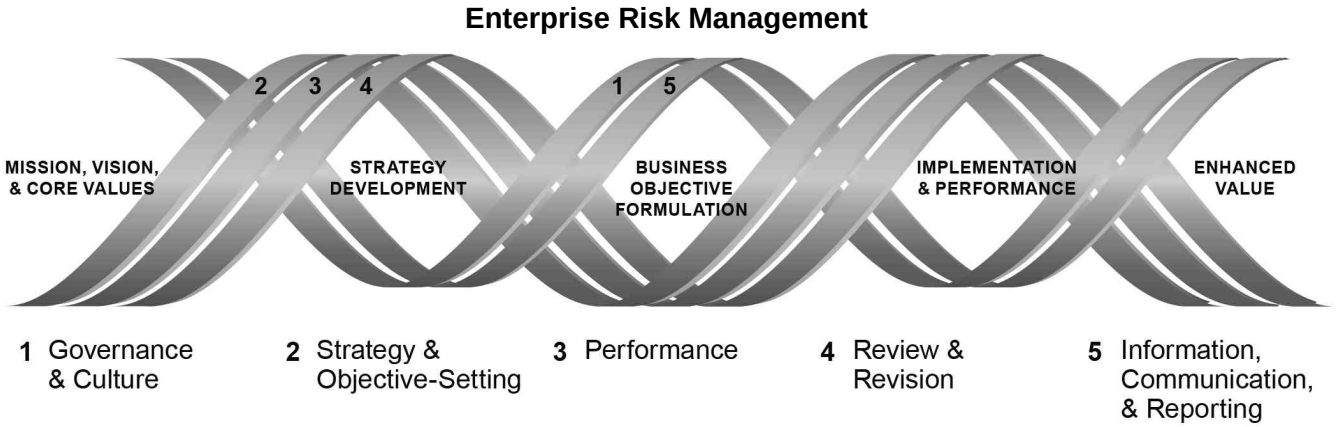


Figure 2-4

   a. The COSO ERM framework consists of **five interrelated components**. Twenty principles are distributed among the components.

      1) The **supporting aspect** components are

         a) Governance and culture and
         b) Information, communication, and reporting.

2) The **common process** components are

a) Strategy and objective-setting,
b) Performance, and
c) Review and revision.

5. **Governance and Culture**

a. Governance sets the organization's tone and establishes responsibilities for ERM. Culture relates to the desired behaviors, values, and overall understanding about risk held by personnel within the organization. **Five principles** relate to governance and culture:

1) The **board** exercises risk **oversight**.

a) The full board ordinarily is responsible for risk oversight. However, the board may delegate risk oversight to a board committee, such as a **risk committee**.
b) The board's oversight role may include, but is not limited to,

i) Reviewing and challenging decisions related to strategy, risk appetite, and significant business decisions (e.g., mergers and acquisitions).
ii) Approving management compensation.
iii) Participating in stakeholder relations.

c) Risk oversight is most effective when the board

i) Has the necessary **skills**, **experience**, and **business knowledge** to (a) understand the organization's strategy and industry and (b) maintain this understanding as the business context changes.
ii) Is **independent** of the organization.
iii) Determines whether ERM capabilities and practices enhance value.
iv) Understands the **organizational biases** influencing decision making and challenges management to minimize them.

2) The organization establishes **operating structures**.

a) They describe how the entity is organized and carries out its day-to-day operations.
b) They generally are aligned with the entity's legal structure and management structure.

i) The **legal structure** determines how the entity operates (e.g., as a single legal entity or as multiple, distinct legal entities).
ii) The **management structure** establishes reporting lines (e.g., direct reporting versus secondary reporting), roles, and responsibilities. Management is responsible for clearly defining roles and responsibilities.

c) Factors to consider when establishing and evaluating operating structures include the entity's

i) Strategy and business objectives, including related risks;
ii) Nature, size, and geographic distribution;
iii) Assignment of authority, accountability, and responsibility at all levels;
iv) Types of reporting lines and communication channels; and
v) Reporting requirements (e.g., financial, tax, regulatory, and contractual).

3) The organization defines the desired **culture**.

a) The board and management are responsible for defining culture.

b) Culture is shaped by internal and external factors.

i) **Internal** factors include (a) the level of judgment and autonomy allowed to personnel, (b) standards and rules, and (c) the reward system in place.

ii) **External** factors include (a) legal requirements and (b) expectations of stakeholders (e.g., customers and investors).

c) The organization's definition of culture determines its placement on the **culture spectrum**, which ranges from risk averse to risk aggressive.

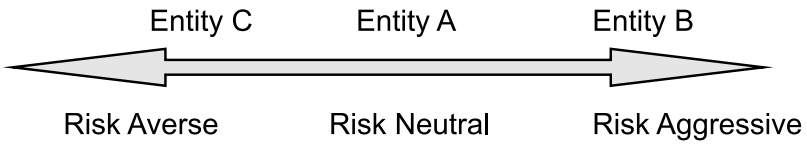


Figure 2-5

4) The organization demonstrates commitment to **core values**.

a) The organization's core values should be reflected in all its actions and decisions.

b) The **tone of the organization** is the manner in which core values are communicated across the organization.

c) When risk-aware culture and tone are aligned, stakeholders have confidence that the organization is abiding by its core values.

5) The organization **attracts**, **develops**, and **retains** capable individuals.

a) Management is responsible for defining the human capital necessary (the needed competencies) to achieve strategy and business objectives.

b) The **human resources function** assists management in developing competency requirements through processes that attract, train, mentor, evaluate, reward, and retain competent individuals.

c) **Contingency plans** should be developed to prepare for succession. Such plans train selected personnel to assume responsibilities vital to ERM. An example is training a risk manager to assume the position of risk officer.

6. **Strategy and Objective Setting**

a. Strategy must support the organization's mission, vision, and core values. The integration of ERM with strategy setting helps to understand the risk profile related to strategy and business objectives. **Four principles** relate to strategy and objective setting:

1) The organization analyzes **business context** and its effect on the risk profile.

a) Business context pertains to the relationships, events, trends, and other factors that influence the organization's strategy and business objectives. Accordingly, business context includes the organization's internal and external environments.

i) The **internal environment** consists of factors related to four categories: (a) capital (e.g., assets), (b) people (e.g., skills and attitudes), (c) processes (e.g., tasks, policies, and procedures), and (d) technology.

ii) The **external environment** consists of factors related to six categories (i.e., **PESTLE** analysis): (a) political (government intervention and influence), (b) economic (e.g., interest rates and availability of credit), (c) social (e.g., consumer preferences and demographics), (d) technological (e.g., R&D activity), (e) legal (laws, regulations, and industry standards), and (f) environmental (e.g., climate change).

b) Business context may be

i) **Dynamic.** New, emerging, and changing risks can appear at any time (e.g., low barriers of entry allow new competitors to emerge).

ii) **Complex.** A context may have many interdependencies and interconnections (e.g., a transnational company has several operating units around the world, each with unique external environmental factors).

iii) **Unpredictable.** Change occurs rapidly and in unanticipated ways (e.g., currency fluctuations).

c) The effect of business context on the risk profile may be analyzed based on past, present, and future performance.

2) The organization defines **risk appetite** (the amount of risk it is willing to accept in pursuit of value).

a) The organization considers its mission, vision, culture, prior strategies, and risk capacity (the maximum risk it can assume) to set its risk appetite.

b) In setting risk appetite, the optimal balance of opportunity and risk is sought.

i) Risk appetite is rarely set above risk capacity.

c) Risk appetite may be expressed **qualitatively** (e.g., low, moderate, high) or **quantitatively** (e.g., as a percentage of a financial amount). But it should reflect how risk assessment results are expressed.

d) The board approves the risk appetite, and management communicates it throughout the organization.

3) The organization evaluates **alternative strategies** and their effects on the risk profile.

a) Approaches to evaluating strategy include SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis, competitor analysis, and scenario analysis.

b) The organization must evaluate

i) The strategy's alignment with its mission, vision, core values, and risk appetite and

ii) The implications of the chosen strategy (its risks, opportunities, and effects on the risk profile).

c) Strategy should be changed if it fails to create, realize, or preserve value.

4) The organization establishes **business objectives** that align with and support strategy.

a) Business objectives are (1) specific, (2) measurable, (3) observable, and (4) obtainable.

b) Business objectives may relate to, among others, financial performance, operational excellence, or compliance obligations.

c) Performance measures, targets, and **tolerances** (the range of acceptable variation in performance) are established to evaluate the achievement of objectives.

7. **Performance**

   a. Performance relates to ERM practices that support the organization's decisions in pursuit of value. Those practices consist of identifying, assessing, prioritizing, responding to, and developing a portfolio view of risk. **Five principles** relate to performance:

      1) The organization **identifies risks** that affect the performance of strategy and business objectives.

         a) The organization should identify risks that disrupt operations and affect the **reasonable expectation** of achieving strategy and business objectives.

         b) **New**, **emerging**, and **changing** risks are identified. Examples are risks resulting from changes in business objectives or the business context.

            i) **Opportunities** (actions or potential actions that create or alter goals or approaches for the creation, preservation, or realization of value) also are identified. They differ from **positive events**, occurrences in which performance exceeds the original target.

         c) Risk identification **methods** and **approaches** include (1) day-to-day activities (e.g., budgeting, business planning, or reviewing customer complaints), (2) simple questionnaires, (3) facilitated workshops, (4) interviews, or (5) data tracking.

         d) The **risk inventory** consists of all risks that could affect the entity.

         e) Risk and opportunity identification should be comprehensive across all levels and functions of the entity.

      2) The organization assesses the **severity of risk**. Severity is a measure of such considerations as impact, likelihood, and the time to recover from events.

         a) Common measures of severity include combinations of impact and likelihood.

            i) **Impact** is the result or effect of the risk. Impact may be positive or negative.

            ii) **Likelihood** is the possibility that an event will occur. Likelihood may be expressed qualitatively (e.g., a remote probability), quantitatively (e.g., a 75% probability), or in terms of frequency (e.g., once every 6 months).

         b) The **time horizon** to assess risk should be identical to that of the related strategy and business objective. For example, the risk affecting a strategy that takes 2 years to achieve should be assessed over the same period.

         c) Risk is assessed at **multiple levels** (e.g., entity, division, operating unit, and function) of the organization and linked to the related strategy and business objective.

            i) The severity of a risk may vary across levels. For example, a risk with high severity at the operating unit level may have low or moderate severity at the entity level.

         d) Qualitative and quantitative methods may be used to assess risk.

            i) **Qualitative** methods are more efficient and less costly than quantitative methods. Examples are interviews, surveys, and benchmarking.

            ii) **Quantitative** methods are more precise than qualitative methods. Examples are decision trees, modeling (probabilistic and nonprobabilistic), and Monte Carlo simulations.

         e) The organization should **reassess severity** whenever triggering events occur, such as changes in business context and risk appetite.

f) The risk assessment should consider inherent risk, target residual risk, and actual residual risk.

g) Assessment results may be presented using a **heat map**, which highlights the relative severity of each risk. The warmer the color, the more severe the risk.

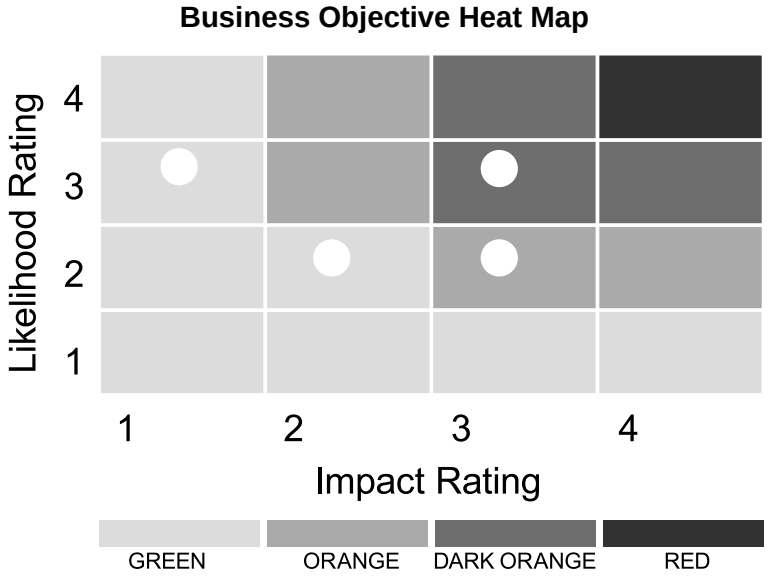


Figure 2-6

3) The organization **prioritizes risks** at all levels.

a) Risk prioritization enables the organization to optimize the allocation of its limited resources.

b) In addition to severity (e.g., impact and likelihood), the following factors are considered when prioritizing risks:

i) Agreed-upon criteria,
ii) Risk appetite,
iii) The importance of the affected business objective(s), and
iv) The organizational level(s) affected.

c) **Agreed-upon criteria** are used to evaluate the characteristics of risks and to determine the entity's capacity to respond appropriately. Higher priority is given to risks that most affect the criteria. Example criteria include the following:

i) **Complexity** is the nature and scope of a risk, e.g., interdependence of risks.

ii) **Velocity** is the speed at which a risk affects the entity.

iii) **Persistence** is how long a risk affects the entity, including the time it takes the entity to recover.

iv) **Adaptability** is the entity's capacity to adjust and respond to risks.

v) **Recovery** is the entity's capacity (not the time) to return to tolerance.

d) Higher priority also is assigned to risks that

i) Approach or exceed risk appetite,
ii) Cause performance levels to approach the outer limits of tolerance, or
iii) Affect the entire entity or occur at the entity level.

4) The organization identifies and selects **risk responses**, recognizing that risk may be managed but not eliminated. Risks should be managed within the business context and objectives, performance targets, and risk appetite.
    a) The following are the five categories of risk responses:
        i) **Acceptance.** No action is taken to alter the severity of the risk. Acceptance is appropriate when the risk is within the risk appetite.
        ii) **Avoidance.** Action is taken to remove the risk (e.g., discontinuing a product line or selling a subsidiary). Avoidance typically suggests no response would reduce the risk to an acceptable level.
        iii) **Pursuit.** Action is taken to accept increased risk to improve performance without exceeding acceptable tolerance.
        iv) **Reduction.** Action is taken to reduce the severity of the risk so that it is within the target residual risk profile and risk appetite.
        v) **Sharing.** Action is taken to reduce the severity of the risk by transferring a portion of the risk to another party. Examples are insurance, hedging, joint ventures, and outsourcing.
    b) The following are the **factors** considered in selecting and implementing risk responses:
        i) They should be chosen for, or adapted to, the **business context**.
        ii) **Costs and benefits** should be proportionate to the severity of the risk and its priority.
        iii) They should further **compliance** with obligations (e.g., industry standards) and achievement of **expectations** (e.g., mission, vision, and stakeholder expectations).
        iv) They should bring risk within **risk appetite** and result in performance outcomes within **tolerance**.
        v) Risk response should reflect risk severity.
    c) **Control activities** are designed and implemented to ensure risk responses are carried out.
5) The organization develops and evaluates its **portfolio view of risk**.
    a) The culmination of risk identification, assessment, prioritization, and response is the full portfolio view of risk.
    b) The following four risk views have different levels of risk integration:
        i) **Risk view (minimal integration).** Risks are identified and assessed. Emphasis is on the event, not the business objective.
        ii) **Risk category view (limited integration).** Identified and assessed risks are categorized, e.g., based on operating structures.

iii) **Risk profile view (partial integration).** Risks are linked to the business objectives they affect, and any dependencies between objectives are identified and assessed. For example, an objective of increased sales may depend on an objective to introduce a new product line.

iv) **Portfolio view (full integration).** This composite view of risks relates to **entity-wide** strategy and business objectives and their effect on **entity** performance. At the top level, greater emphasis is on strategy. Thus, responsibility for business objectives and specific risks **cascades** through the entity.

c) Using a portfolio view of risk, management determines whether the entity's **residual risk profile** (risk profile inclusive of risk responses) aligns with overall **risk appetite**.

d) Qualitative and quantitative methods may be used to evaluate how changes in risk may affect the portfolio view of risk.

i) **Qualitative** methods include benchmarking, scenario analysis, and stress testing.

ii) **Quantitative** methods include statistical analysis.

8. **Review and Revision**

a. The organization reviews and revises its current ERM capabilities and practices based on changes in strategy and business objectives. **Three principles** relate to review and revision:

1) The organization identifies and assesses **changes** that may substantially affect strategy and business objectives.

a) Changes in the organization's **business context** and **culture** are most likely to substantially affect strategy and business objectives.

b) Such changes may result from changes in the organization's internal or external environment.

i) Substantial changes in the **internal environment** include those due to rapid growth, innovation, and turnover of key personnel.

ii) Substantial changes in the **external environment** include those in the economy or regulations.

2) The organization reviews **entity performance** results and considers **risk**.

a) Performance results that deviate from target performance or tolerance may indicate (1) unidentified risks, (2) improperly assessed risks, (3) new risks, (4) opportunities to accept more risk, or (5) the need to revise target performance or tolerance.

3) The organization pursues **improvement** of ERM.

a) The organization must continually improve ERM at all levels, even if actual performance aligns with target performance or tolerance.

b) Methods of identifying areas for improvement include **continual** or **separate evaluations** and peer comparisons (reviews of industry peers).

9. **Information, Communication, and Reporting**

   a. The organization must capture, process, manage (organize and store), and communicate timely and relevant information to **identify risks** that could affect strategy and business objectives. **Three principles** relate to information, communication, and reporting:

      1) The organization leverages its **information systems** to support ERM.

         a) **Data** are raw facts collectible for analysis, use, or reference. **Information** is processed, organized, and structured data about a fact or circumstance. Information systems transform data (e.g., risk data) into relevant information (e.g., risk information).

            i) **Knowledge** is data transformed into information.

            ii) Information is **relevant** if it helps the organization be more agile in decision making, giving it a competitive advantage.

         b) **Structured** data are generally well organized and easily searchable (e.g., spreadsheets, public indexes, or database files).

            i) **Unstructured** data are unorganized or lack a predefined pattern (e.g., word processing documents, videos, photos, or email messages).

         c) **Data management** practices help ensure that risk information is useful, timely, relevant, and of high quality. The following are the elements of effective data management:

            i) **Data and information governance.** Standards are established for the delivery, quality, timeliness, security, and architecture of data. Roles and responsibilities also are defined for risk information owners and data owners.

            ii) **Processes and controls.** Activities are implemented to ensure established data standards are reinforced and corrections are made as necessary.

            iii) **Data management architecture.** Information technology is designed that determines what data are collected and how the data are used.

         d) Information systems must be **adaptable to change**. As the organization adapts its strategy and business objectives in response to changes in the business context, its information systems also must change.

      2) The organization uses **communication channels** to support ERM.

         a) Communications about risk

            i) Management communicates the organization's strategy and business objectives to internal (e.g., personnel and the board) and external (e.g., shareholders) stakeholders.

            ii) Communications between management and the board should include continual discussions about **risk appetite**.

         b) Channels and methods

            i) Organizations should adopt **open communication channels** to allow risk information to be sent and received both ways (e.g., to and from personnel or suppliers).

ii) Communication **methods** include written documents (e.g., policies and procedures), electronic messages (e.g., email), public events or forums (e.g., town hall meetings), and informal or spoken communications (e.g., one-on-one discussions).

iii) The board may hold **formal** quarterly meetings or call **extraordinary** meetings (special meetings to discuss urgent matters).

3) The organization **reports** on risk, culture, and performance at multiple levels and across the entity.

a) The purpose of reporting is to **support** personnel in their

i) Understanding of the relationships among risk, culture, and performance.

ii) Decision making related to (a) setting strategy and objectives, (b) governance, and (c) day-to-day operations.

b) Reporting combines qualitative and quantitative risk information, with greater emphasis on information that supports **forward-looking** decisions.

c) **Management** is responsible for implementing **controls** to ensure reports are accurate, complete, and clear.

d) The **frequency of reporting** is based on the severity and priority of the risk.

e) Reports on **culture** may be communicated, among other means, in surveys and lessons-learned analyses.

f) **Key indicators of risk** should be reported with key performance indicators to emphasize the relationship of risk and performance.

10. **Assessing ERM**

a. The COSO ERM framework provides criteria for assessing whether the organization's ERM culture, capabilities, and practices together effectively manage risks to strategy and business objectives.

b. When the **components**, **principles**, and supporting **controls** are present and functioning, ERM is **reasonably expected** to manage risks effectively and to help create, preserve, and realize **value**.

1) **Present** means the components, principles, and controls exist in the design and implementation of ERM to achieve objectives.

2) **Functioning** means the components, principles, and controls continue to operate to achieve objectives.

11. **ERM Limitations**

a. Limitations of ERM result from the possibility of

1) Faulty human judgment,
2) Cost-benefit considerations,
3) Simple errors or mistakes,
4) Collusion, and
5) Management override of ERM practices.

STUDY UNIT THREE

FINANCIAL MARKETS AND TYPES OF SECURITIES

This study unit is the **first of four** on **corporate finance**. The relative weight assigned to this major topic in Part 2 of the exam is **20%**. The four study units are

Study Unit 3: Financial Markets and Types of Securities
Study Unit 4: Valuation Methods and Cost of Capital
Study Unit 5: Managing Current Assets
Study Unit 6: Corporate Restructuring and International Finance

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

3.1 FINANCIAL MARKETS AND SECURITIES OFFERINGS

1. Aspects of Financial Markets

a. Financial markets facilitate the creation and transfer of financial assets and obligations. They bring together entities that have funds to invest with entities that have financing needs.

1) The resulting transactions create assets for the former entities and obligations for the latter.

2) Transfers of funds may be either direct or through intermediate entities, such as banks.

a) The use of intermediate entities and financial markets improves allocative efficiency because of their special expertise.

b) The result is the availability of relatively rapid and low-cost transfers of capital, an essential feature of a modern economy.

b. Financial markets are not particular places, but rather the totality of supply and demand for securities.

1) Securities include a very wide variety of instruments.

2) Some of the most basic are stocks, corporate bonds, mortgages, consumer loans, leases, commercial paper, certificates of deposit, governmental securities, and derivatives of many kinds.

a) Moreover, new kinds of securities are continually being developed.

2. **Money Markets and Capital Markets**
    a. Money markets trade debt securities with maturities of less than 1 year.
        1) These are dealer-driven markets because most transactions involve dealers who buy and sell instruments at their own risk.
            a) The dealer is a principal in most transactions, unlike a stockbroker who acts as an agent.
        2) Money market securities are generally short-term and marketable.
            a) They usually have low default risk.
        3) Money market securities include
            a) Government Treasury bills
            b) Government Treasury notes and bonds
            c) Federal agency securities
            d) Short-term tax-exempt securities
            e) Commercial paper
            f) Certificates of deposit
            g) Repurchase agreements
            h) Eurodollar CDs
            i) Bankers' acceptances
        4) Money markets exist in New York, London, and Tokyo.
    b. Capital markets trade long-term debt and equity securities.
        1) The New York Stock Exchange is an example of a capital market.
3. **Primary Markets and Secondary Markets**
    a. Primary markets are the markets in which corporations and governmental units raise new capital by making initial offerings of their securities.
        1) The issuer receives the proceeds of sale in a primary market.
    b. Secondary markets provide for trading of previously issued securities among investors. Examples of secondary markets include auction markets and dealer markets.
        1) Auction markets like the New York Stock Exchange, the American Stock Exchange, and regional exchanges conduct trading at particular physical sites. Furthermore, share prices are communicated immediately to the public.
            a) Companies that wish to have their shares traded on an exchange must apply for listing and meet certain requirements. For example, the New York Stock Exchange has established requirements relating to the amount and value of shares outstanding, the number of shareholders, earning power, and tangible assets.
                i) Listing is beneficial because it adds to a firm's prestige and increases the liquidity of a firm's securities.
                ii) However, increased SEC disclosure requirements and the greater risk of a hostile takeover are possible disadvantages.

b) Matching of buy and sell orders communicated to brokerages with seats on the exchange is the essence of exchange trading. To facilitate this process, members known as specialists undertake to make a market in particular stocks. These firms are obliged to buy and sell those stocks.

i) Accordingly, a specialist maintains an inventory of stocks and sets bid and asked prices (prices at which the specialist will buy or sell, respectively) to keep the inventory in balance.

ii) The profit margin for the specialist is the spread, or the excess of the asked over the bid price.

c) Stock exchanges have expanded their role to include trading in derivatives.

i) Moreover, commodities markets, e.g., the Chicago Board of Trade and the Chicago Mercantile Exchange also permit trading in derivatives.

ii) Thus, both commodity futures (e.g., in oil, livestock, metals, grains, and fibers) and financial futures (e.g., in U.S. Treasury Securities, foreign currencies, stock indexes, bonds, and certificates of deposit) are now traded on commodity exchanges.

2) The over-the-counter (OTC) market is a dealer market. It consists of numerous brokers and dealers who are linked by telecommunications equipment that enables them to trade throughout the country. The OTC market conducts transactions in securities not traded on the stock exchanges.

a) The OTC market handles transactions involving

i) Bonds of U.S. companies

ii) Bonds of federal, state, and local governments

iii) Open-end investment company shares of mutual funds

iv) New securities issues

v) Most secondary stock distributions, whether or not they are listed on an exchange

b) The governing authority for the OTC market is the National Association of Securities Dealers (NASD). Its computerized trading system is the NASD Automated Quotation (NASDAQ) system, which supplies price quotes and volume amounts during the trading day.

c) The majority of stocks are traded in the OTC market, but the dollar volume of trading on the exchanges is greater because they list the largest companies.

d) Brokers and dealers of OTC securities may also maintain inventories of securities to match buy and sell orders efficiently.

e) Trading in the bonds of corporations is primarily done in the OTC market by large institutional investors, such as pension funds, mutual funds, and life insurance companies. Because very large amounts are exchanged among a few investors, dealers in the bond markets can feasibly arrange these transactions. A similar arrangement for trading of stocks would be difficult because they are owned by millions of shareholders.

4. **Financial Intermediaries**

   a. Financial intermediaries are specialized firms that help create and exchange the instruments of financial markets. Financial intermediaries increase the efficiency of financial markets through better allocation of financial resources.

      1) A financial intermediary obtains funds from savers, issues its own securities, and uses the money to purchase an enterprise's securities. Thus, financial intermediaries create new forms of capital. For example, a savings and loan association purchases a mortgage with its funds from savers and issues a savings account or a certificate of deposit.

   b. Financial intermediaries include

      1) Commercial banks
      2) Life insurance companies
      3) Private pension funds
      4) Nonbank thrift institutions, such as savings banks and credit unions
      5) State and local pension funds
      6) Mutual funds
      7) Finance companies
      8) Casualty insurance companies
      9) Money market funds
      10) Mutual savings banks
      11) Credit unions
      12) Investment bankers

5. **Insider Trading and Efficient Markets Hypothesis**

   a. Insider trading is the trading of securities while possessing nonpublic information about the securities.

      1) This type of trading is illegal because it undermines investor confidence in the integrity and fairness of the financial markets.

   b. The efficient markets hypothesis states that current stock prices immediately and fully reflect all relevant information. Hence, the market is continuously adjusting to new information and acting to correct pricing errors.

      1) In other words, securities prices are always in equilibrium. The reason is that securities are subject to intense analysis by many thousands of highly trained individuals.

      2) These analysts work for well-capitalized institutions with the resources to take very rapid action when new information is available.

   c. The efficient markets hypothesis states that it is impossible to obtain abnormal returns consistently with either fundamental or technical analysis.

      1) Fundamental analysis is the evaluation of a security's future price movement based upon sales, internal developments, industry trends, the general economy, and expected changes in each factor.

      2) Technical analysis is the evaluation of a security's future price based on the sales price and number of shares traded in a series of recent transactions.

   d. Under the efficient markets hypothesis, the expected return of each security is equal to the return required by the marginal investor given the risk of the security. Moreover, the price equals its fair value as perceived by investors.

e. The efficient markets hypothesis has three forms (versions):

1) **Strong Form**

a) All public and private information is instantaneously reflected in securities' prices. Thus, insider trading is assumed not to result in abnormal returns.

2) **Semistrong Form**

a) All publicly available data are reflected in security prices, but private or insider data are not immediately reflected. Accordingly, insider trading can result in abnormal returns.

3) **Weak Form**

a) Current securities prices reflect all recent past price movement data, so technical analysis will not provide a basis for abnormal returns in securities trading.

4) Empirical data have refuted the strong form of the efficient markets hypothesis but not the weak and semistrong forms.

f. The market efficiently incorporates public information into securities prices. However, when making investment decisions, investors should be aware of economic information about the firm's markets and the strength of the products of the firm.

1) Because the possibility exists that all information is not reflected in security prices, there is an opportunity for arbitrage.

6. **Rating Agencies**

a. A firm must pay to have its debt rated. Moody's, Standard & Poor's, and Fitch are the most frequently used agencies.

1) Ratings are based upon the probability of default and the protection for investors in case of default.

b. The ratings are determined from corporate information, such as financial statements.

1) Important factors involved in the analysis include the ability of the issuer to service its debt with its cash flows, the amount of debt it has already issued, the type of debt issued, and the firm's cash flow stability.

2) A rating may change because the rating agencies periodically review outstanding securities. A decrease in the rating may increase the firm's cost of capital or reduce its ability to borrow long-term. One reason is that many institutional investors are not allowed to purchase lower-grade securities.

3) A rating agency review of existing securities may be triggered by a variety of factors, e.g., a new issue of debt, an intended merger involving an exchange of bonds for stock, or material changes in the economic circumstances of the firm.

c. The ratings are significant because higher ratings reduce interest costs to issuing firms. Lower ratings incur higher required rates of return.

1) The lower the risk of default, the lower the interest rate the market will demand.

d. Standard & Poor's rates bonds from very high quality to very poor quality.
   1) AAA and AA are the highest, signifying little chance of default and high quality.
   2) A- and BBB-rated bonds are of investment grade. They have strong interest- and principal-paying capabilities.
      a) Bonds with these ratings are the lowest-rated securities that many institutional investors are permitted to hold.
   3) Debt rated BB and below is speculative; such bonds are junk bonds.
      a) Junk bonds are high-yield or low-grade bonds.
      b) These high-risk bonds have received much attention in the last decade because of their use in corporate mergers and restructurings and the increase in junk-bond defaults.
   4) CCC to D are very poor debt ratings. The likelihood of default is significant, or the debt is already in default (D rating).
   5) Standard & Poor's adjusts its ratings with the use of a plus-minus system. A plus indicates a stronger rating in a category, and a minus indicates a weaker rating.

e. Moody's rates bonds in a similar manner. Its ratings vary from Aaa for very high quality debt to D for very poor debt.

7. **Investment Banking**

a. Investment bankers serve as intermediaries between businesses and the providers of capital.
   1) They not only help to sell new securities but also assist in business combinations, act as brokers in secondary markets, and trade for their own accounts.

b. In their traditional role in the sale of new securities, investment bankers help determine the method of issuing the securities and the price to be charged, distribute the securities, provide expert advice, and perform a certification function.
   1) An issuer of new securities ordinarily selects an investment banker in a negotiated deal.
      a) Only a few large issuers seek competitive bids.
      b) The reason for the predominance of negotiated deals is that the costs of learning about the issuer and setting an issue price and fees are usually prohibitive unless the investment banker has a high probability of closing the deal.
   2) An investment banker issues securities through best efforts sales and underwriting deals.
      a) Best efforts sales of securities provide no guarantee that the securities will be sold or that enough cash will be raised.
         i) The investment banker receives commissions and is obligated to provide its best efforts to sell the securities.
      b) An underwritten deal or a firm commitment provides a guarantee.
         i) The investment banker agrees to purchase the entire issue and resell it. Thus, the issuer does not bear the risk of not being able to sell the issue.

c. A prospective issuer and an investment banker conduct preunderwriting conferences to discuss such basic questions as the amount to be raised, the type of securities to issue, and the nature of their agreement.

d. The next step is the filing of a registration statement with the SEC. This process may be necessary whether the issue is an initial public offering (item 8. beginning on the next page) or a seasoned issue (one made by a company whose securities are already publicly traded).

e. Determining the offering price of the securities is crucial. For a seasoned issue, the offering price may be pegged to the price of the existing securities, such as the market price of stock or the yield on bonds. For example, an issue of common stock may be priced at a certain percentage below the closing price on the last day of the registration period.

f. A single investment banker ordinarily does not underwrite an entire issue of securities unless the amount is relatively small.

    1) To share the risk of overpricing the issue or of a market decline during the offering period, the investment banker (the lead or managing underwriter) forms an underwriting syndicate with other firms.

    2) The members of the syndicate share in the underwriting commission, but their risk is limited to the percentage of their participation.

g. **Flotation costs**, or the costs of issuing new securities, are relatively lower for large issues than those for small issues. These costs include the following:

    1) The **underwriting spread** is the difference between the price paid by purchasers and the net amount received by the issuer.

    2) The issuer incurs expenses for filing fees, taxes, accountants' fees, and attorneys' fees. These costs are essentially fixed.

    3) The issuer incurs indirect costs because of management time devoted to the issue.

    4) Announcement of a new issue of seasoned securities usually results in a price decline. One theory is that the announcement is a negative signal to the market. Management may not want to issue new stock when it is undervalued. Moreover, existing owners do not want to share the company's growth with additional owners.

        a) A **seasoned** security is a financial instrument that has been publicly traded long enough to eliminate any short-term effects caused by its IPO. Securities on the Euromarket must have traded for at least 40 days to qualify as "seasoned."

    5) An offer of unseasoned securities (an initial public offering) tends to be significantly underpriced compared with the price in the aftermarket.

h. Flotation costs tend to be greater for common stock than for preferred stock and for stocks than for bonds.

8. **Initial Public Offerings (IPOs)**

   a. A firm's first issuance of securities to the public is an initial public offering.

      1) The process by which a closely held corporation issues new securities to the public is called going public. When a firm goes public, it issues its stock on a new issue or initial public offering market.

      2) Later issues of stock by the same company are subsequent or secondary offerings.

         a) In a **subsequent offering**, the company offers additional shares which are usually issued from the company's treasury.

         b) In a **secondary offering**, the company issues new stock for public sale.

   b. Advantages of going public include

      1) The ability to raise additional funds
      2) The establishment of the firm's value in the market
      3) An increase in the liquidity of the firm's stock

   c. Disadvantages of going public include

      1) Costs of the reporting requirements of the SEC and other agencies
      2) Access to the company's operating data by competing firms
      3) Access to net worth information of major shareholders
      4) Limitations on self-dealing by corporate insiders, such as officers and major shareholders
      5) Pressure from outside shareholders for earnings growth
      6) Stock prices that do not accurately reflect the true net worth of the company
      7) Loss of control by management as ownership is diversified
      8) Need for improved management control as operations expand
      9) Increased shareholder servicing costs

   d. To have its stock listed (have it traded on a stock exchange), the firm must apply to a stock exchange, pay a fee, and fulfill the exchange's requirements for membership.

      1) Included in the requirements for membership is disclosure of the firm's financial data.

   e. Once the decision to make an initial public offering has been made, the questions are similar to those for seasoned issues: the amount to be raised, the type of securities to sell, and the method of sale. For example, the following matters should be considered in selecting the type of securities to issue:

      1) Should fixed charges be avoided? The issuance of debt would create fixed charges.
      2) Is a maturity date on the security preferable, or is permanent capital more attractive?
      3) Does the firm want a cushion to protect itself from losses to the firm's creditors?
      4) How quickly and easily does the firm want to raise the capital?
      5) Is the firm concerned about losing control of the company?
      6) How does the cost of underwriting differ among the types of securities?

   f. The company's next step is to prepare and file a registration statement and prospectus with the Securities and Exchange Commission (SEC).

g. A public issue of securities may be sold through a cash offer or a rights offer.

   1) A cash offer follows the procedures previously described.

   2) A rights offer gives existing shareholders an option to purchase new shares before they are offered to the public. If the corporate charter provides for a preemptive right, a rights offer is mandatory.

      a) The rights or options are evidenced by warrants that state the terms of the arrangement, including subscription price, the number of rights required to purchase one share, and the expiration date. Shareholders may exercise the rights, sell them, or allow them to expire.

      b) Under a standby underwriting arrangement, an underwriter may agree to buy undersubscribed shares. However, granting other shareholders an oversubscription privilege reduces the probability of needing to resort to the underwriter.

      c) The **green shoe** option allows underwriters to buy additional shares to compensate for oversubscriptions. A cost is involved because the option will be exercised only when the offer price is lower than the market price. A green shoe agreement is an option that allows the underwriter of an initial public offering to issue more shares than were originally planned if there is strong demand and the stock price rises. With more shares, the underwriter collects more fees. The option gets its name from the first company to sign such an agreement in 1963, the Green Shoe Manufacturing Co.

   3) A cash offer is made to any interested party, whereas a rights offer is made to current security holders. Debt is normally sold by cash offer, but equity securities may be sold by either means.

   4) An IPO necessarily involves a cash offer because, if existing security holders desired to purchase the new issue, no public offer would be made.

   5) A seasoned equity issue may be sold in a cash offer or a rights offer.

   6) A registered offering of a large block of a previously issued security by a current shareholder is a secondary offering. The proceeds of the sale go to the holder, not the original issuer, and the number of shares outstanding does not change. A secondary offering is also called a secondary distribution.

h. The ability of a firm to raise capital through an IPO, the issuance of bonds, or by other means significantly depends upon the quality of the information it provides to potential investors, creditors, regulators, and others.

   1) One such source of information is a set of audited financial statements accompanied by the opinion of the independent external auditor.

      a) This opinion attests to the fairness of the financial statements. The independence and professional reputation of the auditor give the opinion its value.

   2) The unmodified opinion provides the highest level of assurance.

      a) An unmodified opinion states that the financial statements present fairly, in all material respects, the financial position, results of operations, and cash flows of the entity in conformity with accounting principles generally accepted in the United States of America.

3.2 RISK AND RETURN

1. Rate of Return

a. A return is the amount received by an investor as compensation for taking on the risk of the investment.

$$\text{Return on investment} = \text{Amount received} - \text{Amount invested}$$

1) EXAMPLE: An investor paid $100,000 for an investment that returned $112,000. The investor's return is $12,000 ($112,000 – $100,000).

b. The rate of return is the return stated as a percentage of the amount invested.

$$\text{Rate of return} = \frac{\text{Return on investment}}{\text{Amount invested}}$$

1) EXAMPLE: The investor's rate of return is 12% ($12,000 ÷ $100,000).

2. Two Basic Types of Investment Risk

a. **Systematic risk**, also called **market risk**, is the risk faced by all firms. Changes in the economy as a whole, such as the business cycle, affect all players in the market.

1) For this reason, systematic risk is sometimes referred to as undiversifiable risk. Since all investment securities are affected, this risk cannot be offset through portfolio diversification.

b. **Unsystematic risk**, also called **nonmarket or company risk**, is the risk inherent in a particular investment security. This type of risk is determined by the issuer's industry, products, customer loyalty, degree of leverage, management competence, etc.

1) For this reason, unsystematic risk is sometimes referred to as diversifiable risk. Since individual securities are affected differently by economic conditions, this risk can be offset through portfolio diversification.

3. Other Types of Investment Risk

a. **Credit risk** is the risk that the issuer of a debt security will default. This risk can be gauged by the use of credit-rating agencies.

b. **Foreign exchange risk** is the risk that a foreign currency transaction will be affected by fluctuations in exchange rates.

c. **Interest rate risk** is the risk that an investment security will fluctuate in value due to changes in interest rates. In general, the longer the time until maturity, the greater the degree of interest rate risk.

d. **Industry risk** is the risk that a change will affect securities issued by firms in a particular industry. For example, a spike in fuel prices will negatively affect the airline industry.

e. **Political risk** is the probability of loss caused by such government actions as expropriation of assets or changes in laws (e.g., tax or environmental). Political risk can be reduced by making foreign operations dependent on the domestic parent for technology, markets, and supplies.

f. **Liquidity risk** is the risk that a security cannot be sold on short notice for its market value.

g. **Financial risk** is the risk of an adverse outcome based on a change in the financial markets, such as changes in interest rates or changes in investors' desired rates of return.

h. **Purchasing-power risk** is the risk that a general rise in the price level will reduce the quantity of goods that can be purchased with a fixed sum of money.

4. **Relationship between Risk and Return**

   a. Whether the expected return on an investment is sufficient to entice an investor depends on its risk, the risks and returns of alternative investments, and the investor's attitude toward risk.

      1) Most serious investors are risk averse. They have a diminishing marginal utility for wealth. In other words, the utility of additional increments of wealth decreases. The utility of a gain for serious investors is less than the disutility of a loss of the same amount. Due to this risk aversion, risky securities must have higher expected returns.

      2) A risk neutral investor adopts an expected value approach because (s)he regards the utility of a gain as equal to the disutility of a loss of the same amount. Thus, a risk-neutral investor has a purely rational attitude toward risk.

      3) A risk-seeking investor has an optimistic attitude toward risk. (S)he regards the utility of a gain as exceeding the disutility of a loss of the same amount.

5. **Financial Instruments**

   a. Financial managers may select from a wide range of financial instruments in which to invest and with which to raise money.

   b. The following is a short list of widely available long-term financial instruments ranked from the lowest rate of return to the highest (and thus the lowest risk to the highest):

      1) U.S. Treasury bonds
      2) First mortgage bonds
      3) Second mortgage bonds
      4) Subordinated debentures
      5) Income bonds
      6) Preferred stock
      7) Convertible preferred stock
      8) Common stock

   c. These instruments also are ranked according to the level of security backing them. An unsecured financial instrument is much riskier than an instrument that is secured. Thus, the riskier asset earns a higher rate of return.

      1) Mortgage bonds are secured by assets, but common stock is completely unsecured. Accordingly, common stock will earn a higher rate of return than mortgage bonds.

   d. Short-term financial instruments increase the liquidity of an entity.

      1) Commercial paper of an AAA-rated company is the least risky among short-term financial instruments. It is very short-term debt and has priority over equities.

3.3 BONDS

1. Aspects of Bonds

a. Bonds are the principal form of long-term debt financing for corporations and governmental bodies.

1) A bond is a formal contractual obligation to pay an amount of money (called the **par value**, **maturity amount**, or **face amount**) to the holder at a certain date, plus, in most cases, a series of cash interest payments based on a specified percentage (called the **stated rate** or **coupon rate**) of the face amount at specified intervals.

a) The face amount (also called the maturity amount) is received on the bond's maturity date, e.g., 20 years after the initial purchase.

b) The annual cash interest equals the bond's face amount times the stated (or coupon) rate, e.g., $1,000 face amount × 4% stated rate = $40 annual cash interest.

2) All of the terms of the agreement are stated in a document called an **indenture**.

a) The indenture includes matters such as whether the issuer can sell property purchased with bond proceeds and the extent of maintenance the issuer must provide.

b) The indenture also usually states that purchased property must be insured and cannot be pledged as security for another loan.

b. Bringing a bond issue to market requires extensive legal and accounting work. This process is rarely worthwhile for bonds with maturities of less than 10 years.

1) An investment banker performs an underwriting or insurance function when it purchases an issue of securities and then resells them. The risk of price fluctuations during the distribution period is borne entirely by the investment banker.

2) The profit earned is the underwriting spread, or the difference between the purchase and resale prices of the securities.

c. In general, the longer the term of a bond, the higher will be the return (yield) demanded by investors to compensate for increased risk.

d. **Advantages of Bonds to the Issuer**

1) Interest paid on debt is tax deductible.

a) This is by far the most significant advantage of debt. For a corporation facing a 40%-50% marginal tax rate, the tax savings produced by the deduction of interest can be substantial.

2) Basic control of the firm is not shared with debtholders.

e. **Disadvantages of Bonds to the Issuer**

1) Unlike returns on equity investments, the payment of interest and principal on debt is a legal obligation.

a) If cash flow is insufficient to service debt, the firm could become insolvent.

2) The legal requirement to pay debt service raises a firm's risk level.

a) Shareholders will demand higher capitalization rates on retained earnings, which may result in a decline in the market price of the stock.

3) The long-term nature of bond debt also affects risk profiles.

a) Debt originally appearing to be profitable may become a burden if interest rates fall and the firm is unable to refinance.

4) Certain managerial prerogatives are usually given up in the contractual relationship outlined in the bond's indenture contract.

a) For example, specific ratios must be kept above a certain level during the term of the loan.

5) The amount of debt financing available to the individual firm is limited.

a) Generally accepted standards of the investment community will usually dictate a certain debt-equity ratio for an individual firm.

b) Beyond this limit, the cost of debt may rise rapidly, or debt may not be available.

f. **Debt covenants** are restrictions or protective clauses that are imposed on a borrower by the creditor in a formal debt agreement or an indenture.

1) Examples of debt covenants include the following:

a) Limitations on issuing long-term or short-term debt
b) Limitations on dividend payments
c) Maintaining certain financial ratios
d) Maintaining specific collateral that backs the debt

2) The more restrictive the debt covenant, the lower the risk that the borrower will not be able to repay its debt. The less risky the investment is for creditors, the lower the interest rate on the debt (since the risk premium is lower).

3) If the debtor breaches the debt covenant, the debt becomes due immediately.

g. **Call provisions** allow the bond issuer to exercise an option to redeem the bonds earlier than the specified maturity date.

1) Since call provisions are undesirable to investors, investors usually demand a higher rate of return when call provisions are included in the bond issue.

h. A bond indenture may require the issuer to establish and maintain a bond **sinking fund**. The objective of making payments into the fund is to segregate and accumulate sufficient assets to pay the bond principal at maturity.

1) The amounts transferred plus the revenue earned on investments provide the necessary funds.

2. **Types of Bonds**
    a. Maturity Pattern
        1) A **term bond** has a single maturity date at the end of its term.
        2) A **serial bond** matures in stated amounts at regular intervals. Investors can choose the maturity that suits their needs.
    b. Valuation
        1) **Variable rate bonds** pay interest that is dependent on market conditions.
        2) **Zero-coupon** or **deep-discount bonds** bear no stated rate of interest and thus involve no periodic cash payments; the interest component consists entirely of the bond's discount.
        3) **Commodity-backed bonds** are payable at prices related to a commodity such as gold.
    c. Redemption Provisions
        1) **Callable bonds** may be repurchased by the issuer at a specified price before maturity.
            a) A callable bond is not as valuable to investors as a straight bond.
        2) **Convertible bonds** may be converted into equity securities of the issuer at the option of the holder under certain conditions.
    d. Securitization
        1) **Mortgage bonds** are backed by specific assets, usually real estate.
        2) **Debentures** are backed by the issuer's full faith and credit but not by specific collateral. Thus, debentures are riskier to investors than secured bonds.
        3) **Equipment trust bonds** are secured by a lien on a specific piece of equipment, such as an airplane or a railroad car. They are used mostly by companies in the transportation industry.
    e. Ownership
        1) **Registered bonds** are issued in the name of the holder. Only the registered holder may receive interest and principal payments.
        2) **Bearer bonds** are not individually registered. Interest and principal are paid to whomever presents the bond.
    f. Priority
        1) **Subordinated debentures** and **second mortgage bonds** are junior securities with claims inferior to those of senior bonds.
    g. Repayment Provisions
        1) **Income bonds** pay interest only if the issuer earns the interest.
        2) **Revenue bonds** are issued by governmental units and are payable from specific revenue sources.
3. **Bond Ratings**
    a. Investors can judge the creditworthiness of a bond issue by consulting the rating assigned by a credit-rating agency. The higher the rating, the more likely the firm is to make good its commitment to pay the interest and principal.

b. This field is dominated by the three largest firms: Moody's, Standard & Poor's, and Fitch.

1) Investment-grade bonds are considered safe investments and thus are deemed to have moderate risk.

a) The highest rating assigned is "triple-A."

b) Some fiduciary organizations (such as banks and insurance companies) are only allowed to invest in investment-grade bonds.

2) Non-investment grade bonds, also called speculative-grade bonds, high-yield bonds, or junk bonds, carry high risk.

a) A **junk bond** is a bond that is rated "BB" or lower because of its high default risk.

b) Junk bonds are high-risk, high-reward securities rated at less than investment grade.

c. The following is a short list of widely available bonds ranked from the lowest rate of return to the highest rate of return (and thus the lowest risk to the highest risk):

1) U.S. Treasury bonds
2) Secured bonds (i.e., first mortgage bonds)
3) Second mortgage bonds
4) Investment grade bonds
5) Subordinated bonds (i.e., deep discount bonds)
6) Income bonds
7) Junk bonds

4. **Interest Rates**

a. The **term structure of interest rates** is the relationship between yield to maturity and time to maturity. It is important to corporate treasurers, who must decide whether to issue short- or long-term debt, and to investors, who must decide whether to buy short- or long-term debt.

1) Higher interest rates on bonds lead to increased demand for bond investments, which decreases the demand for common stock, causing the price of common stock to fall.

b. Therefore, it is important to understand how the long- and short-term rates are related and what causes shifts in their positions. The term structure is graphically depicted by a yield curve.

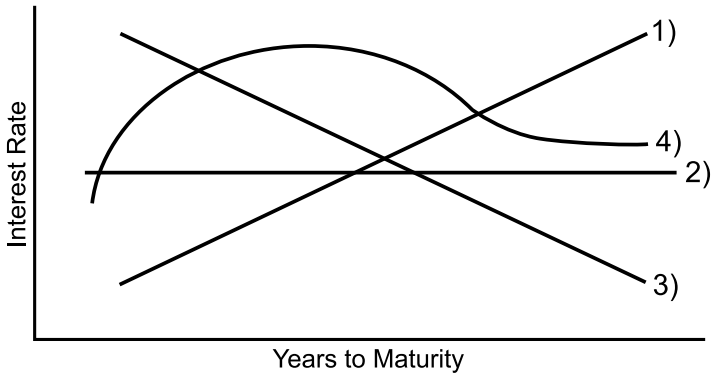


Figure 3-1

c. The graph above illustrates four common yield curves. Since short-term interest rates are usually lower than long-term rates, the yield curve is usually upward sloping. However, other shapes do occur sometimes. The various shapes are as follows:

1) Upward sloping (long-term rates are higher than short-term rates)
2) Flat (long-term rates are equal to short-term rates)
3) Downward sloping (long-term rates are lower than short-term rates)
4) Humped (intermediate-term rates are higher than other rates)

d. Interest Rate Risk

1) Interest rate risk is the risk that an investment security will fluctuate in value due to changes in interest rates.

a) The duration of a bond (its term) is the best measure of interest rate risk and generally, the longer the time until maturity, the greater the degree of interest rate risk. This is why the interest curve is usually upward sloping.

b) The longer a bond's term, the more time interest rate volatility may affect a bond's price, and the more sensitive its price is to interest rate changes.

2) The interest rate is also affected by inflation expectations, among other factors. The lower (higher) the expected inflation, the lower (higher) the interest rate.

5. **Bond Valuation**

a. A primary concern of a bond issuer is the amount of cash that (s)he will receive from investors on the day the bonds are sold.

1) This amount is equal to the **present value of the cash flows** associated with the bonds discounted at the interest rate prevailing in the market at the time (called the market rate or effective rate).

a) The cash flow associated with bonds are

i) Face amount
ii) Interest payments

2) Using the effective interest rate method ensures that the bonds' **yield to maturity** (that is, their ultimate rate of return to the investor) is equal to the rate of return prevailing in the market at the time of the sale.

a) Using the **effective rate** to determine the bonds' present value also ensures that, upon maturity, they will be valued at their face amount.

b. This present value calculation can result in cash proceeds equal to, less than, or greater than the face amount of the bonds, depending on the relationship of the bonds' stated rate of interest to the market rate.

1) If the bonds' **stated rate equals the market rate** at the time of sale, the present value of the bonds will exactly equal their face amount, and the bonds are said to be sold "at par." It is rare, however, for the coupon rate to precisely match the market rate at the time the bonds are ready for sale.

2) If the bonds' **stated rate is lower than the market rate**, investors must be offered an incentive to buy the bonds, since the bonds' periodic interest payments are lower than those currently available in the market.

a) In this case, the issuer receives less cash than the par value and the bonds are said to be sold at a **discount**.

EXAMPLE 3-1 Issuance of Bonds -- Discount

An entity issues 200 6%, 5-year, $5,000 bonds when the prevailing interest rate in the market is 8%. The total face amount of bonds issued is therefore $1,000,000 ($5,000 face amount × 200 bonds). Annual cash interest payments of $60,000 ($1,000,000 face amount × 6% stated rate) will be made at the end of each year. The present value of the cash flows associated with this bond issue, discounted at the market rate of 8%, is calculated as follows:

Present value of face amount ($1,000,000 × 0.68058)	$680,580	
Present value of cash interest ($60,000 × 3.99271)	239,563	(rounded)
Cash proceeds from bond issue	$920,143	

Because the bonds are issued at a discount, the cash proceeds are less than the face amount. The issuer records the following entry:

Cash (present value of cash flows)	$920,143	
Discount on bonds payable (difference)	79,857	
Bonds payable (face amount)		$1,000,000

3) If the bonds' **stated rate is higher than the market rate**, investors are willing to pay more for the bonds, since their periodic interest payments are higher than those currently available in the market.

a) In this case, the issuer receives more cash than the par value and the bonds are said to be sold at a **premium**.

EXAMPLE 3-2 Issuance of Bonds -- Premium

An entity issues 200 8%, 5-year, $5,000 bonds when the prevailing interest rate in the market is 6%. The total face amount of bonds issued is therefore $1,000,000 ($5,000 face amount × 200 bonds). Annual cash interest payments of $80,000 ($1,000,000 face amount × 8% stated rate) will be made at the end of each year. The present value of the cash flows associated with this bond issue, discounted at the market rate of 6%, is calculated as follows:

Present value of face amount ($1,000,000 × 0.74726)	$ 747,260	
Present value of cash interest ($80,000 × 4.21236)	336,989	(rounded)
Cash proceeds from bond issue	$1,084,249	

Because the bonds are issued at a premium, the cash proceeds exceed the face amount. The issuer records the following entry:

Cash (present value of cash flows)	$1,084,249	
Bonds payable (face amount)		$1,000,000
Premium on bonds payable (difference)		84,249

4) Sometimes the issue price is an exact percentage of the face amount. In these cases, the bonds are said to be sold at, for example, "97," "98," "101," "102," etc.

c. Convertible Bonds

1) Convertible debt may be exchanged for common stock of the issuer.

2) The formula for the conversion ratio is the par value of the convertible bond divided by the conversion price.

$$\text{Conversion ratio} = \frac{\text{Par value of convertible bond}}{\text{Conversion price}}$$

6. Interest on Bonds Paid More Often than Annually

a. Some bonds may pay interest more often than annually, e.g., semiannually. The accounting for these bonds is based on the number of periods in which interest is paid.

1) The interest rates on bonds are provided on an annual basis. For the sake of simplicity, the stated rate and the market (effective) interest rate that apply to each period can be calculated as follows:

$$\frac{\text{Interest rate on an annual basis}}{\text{Number of times interest is paid per year}}$$

EXAMPLE 3-3 Bonds -- Semiannual Interest

On January 1, Year 1, Eva Co. issued 5-year, 6%, $100,000 bonds. The bonds pay interest semiannually on July 1 and December 31. The bonds were issued to yield 10%. Thus, the market rate on the day of issuance was 10%. Because interest is paid twice a year, the interest is paid over 10 (5 years × 2) semiannual periods. The stated and effective interest rates on each period are 3% (6% ÷ 2) and 5% (10% ÷ 2), respectively.

The proceeds from the bonds equal the present value of the cash flows associated with the bond issue. These proceeds are calculated based on the following information: 10 periods, stated rate of 3%, cash interest payment each period of $3,000 ($100,000 × 3%), and market (effective) rate of 5%.

Bonds' face amount ($100,000) multiplied by the present value of $1 at 5% for 10 periods (0.614)	$61,400
Annual cash interest ($3,000) multiplied by the present value of an ordinary annuity of $1 at 5% for 10 periods (7.722)	23,166
Cash proceeds from bond issue	$84,566

January 1, Year 1		
Cash	$84,566	
Discount on bonds payable	15,434	
Bonds payable		$100,000

July 1, Year 1		
Interest expense ($84,566 × 5%)	$4,228	
Discount on bonds payable		$1,228
Cash		3,000

3.4 STOCK

1. Common Stock

a. The common shareholders are the **owners of the corporation**, and their rights as owners, although reasonably uniform, depend on the laws of the state in which the firm is incorporated.

1) Equity ownership involves risk because holders of common stock are not guaranteed a return and are last in priority in a liquidation. Shareholders' capital provides the cushion for creditors if any losses occur on liquidation.

b. **Advantages to the Issuer**

1) Common stock does not require a fixed dividend; dividends are paid from profits when available.

2) There is no fixed maturity date for repayment of the capital.

3) The sale of common stock increases the creditworthiness of the firm by providing more equity.

4) Common stock is frequently more attractive to investors than debt because it grows in value with the success of the firm. The higher the common stock value, the more advantageous equity financing is compared with debt financing.

c. **Disadvantages to the Issuer**

1) Cash dividends on common stock are not tax-deductible by the corporation, and so must be paid out of after-tax profits.

2) Control (voting rights) is usually diluted as more common stock is sold. (While this aspect is disadvantageous to existing shareholders, management of the corporation may view it as an advantage.)

3) New common stock sales dilute earnings per share available to existing shareholders.

4) Underwriting costs are typically higher for common stock issues.

5) Too much equity may raise the average cost of capital of the firm above its optimal level.

6) Inflation may increase the yields of new bond issues and decrease demand for common stock. Moreover, higher interest costs reduce funds available for dividends.

d. Common shareholders ordinarily have **preemptive rights**. Preemptive rights give common shareholders the right to purchase any additional stock issuances in proportion to their current ownership percentages.

1) If applicable state law or the corporate charter does not provide preemptive rights, the firm may nevertheless sell to the existing common shareholders in a rights offering.

2) Each shareholder is issued a certificate or warrant that is an option to buy a certain number of shares at a fixed price.

e. As the corporation's owners, the common shareholders have voting rights, that is, they select the firm's board of directors and vote on resolutions.

f. A stock's **par value** represents legal capital. It is an arbitrary value assigned to stock before the stock is issued. It also represents the maximum liability of a shareholder.

2. **Preferred Stock**

   a. Preferred stock is a **hybrid of debt and equity**. It has a fixed charge and increases leverage, but payment of dividends is not a legal obligation. A preferred stock's yield to an investor is usually higher than that of a bond from the same issuer. The preferred stock is slightly more risky than a bond.

      1) Preferred shareholders have a higher priority in bankruptcy than common shareholders but a lower priority than debtholders.

   b. **Typical Provisions of Preferred Stock Issues**

      1) Priority in assets and earnings. If the firm goes bankrupt, the preferred shareholders have priority over common shareholders.

      2) Accumulation of dividends. If preferred dividends are cumulative, dividends in arrears must be paid before any common dividends can be paid.

      3) Participation. Preferred stock may participate with common in excess earnings of the company. For example, 8% participating preferred stock might pay a dividend each year greater than 8% when the corporation is extremely profitable, but nonparticipating preferred stock will receive no more than is stated on the face of the stock.

      4) Par value. Par value is the liquidation value, and a percentage of par equals the preferred dividend.

      5) Redeemability. Some preferred stock may be redeemed at a given time or at the option of the holder or otherwise at a time not controlled by the issuer. This feature makes preferred stock more nearly akin to debt, particularly in the case of transient preferred stock, which must be redeemed within a short time (e.g., 5 to 10 years). The SEC requires a separate presentation of redeemable preferred, nonredeemable preferred, and common stock.

      6) Voting rights. Holders of preferred stock are not ordinarily granted voting rights. However, voting rights may be conferred if preferred dividends are in arrears for a stated period.

      7) Retirement.

         a) Preferred stock issues may be **convertible** into common stock at the option of the shareholder.

         b) The issuer may have the right to repurchase the stock through a **call provision**. For example, the stock may be noncallable for a stated period, after which it may be called if the issuer pays a call premium (an amount exceeding par value).

         c) Preferred stock may have a **sinking fund** that allows for the purchase of a given annual percentage of the outstanding shares.

c. **Advantages to the Issuer**

1) It is a form of equity and therefore builds the creditworthiness of the firm.
2) Control is still held by common shareholders.
3) Superior earnings of the firm are usually still reserved for the common shareholders.

d. **Disadvantages to the Issuer**

1) Cash dividends on preferred stock are not deductible as a tax expense and are paid with after-tax income. The result is a substantially greater cost relative to bonds.
2) In periods of economic difficulty, accumulated unpaid dividends (called dividends in arrears) may create major managerial and financial problems for the firm.

e. Holding preferred stock rather than bonds provides corporations a major tax advantage. At least 70% of the dividends received from preferred stock is tax deductible, but all bond interest received is taxable. The dividends-received deduction also applies to common stock.

3.5 DIVIDENDS

The CMA exam tests one's understanding of what influences a company's dividends policy along with the importance of a stable policy. A candidate will need to identify the types of dividend payouts and when and how a company would use each.

1. **Dividend Policy**

a. A dividend represents a distribution of earnings.

b. Dividend policy determines what portion of a corporation's net income is distributed to shareholders and what portion is retained for reinvestment.

1) A high dividend rate means a slower rate of growth. A high growth rate usually means a low dividend rate.

c. Because both a high growth rate and a high dividend rate are desirable, the financial manager attempts to achieve the balance that maximizes the firm's share price.

1) The most important factor to consider is the future planned uses of cash.

d. Normally, corporations try to maintain a stable level of dividends, even though profits may fluctuate considerably, because many shareholders buy stock with the expectation of receiving a certain dividend every year. Hence, management tends not to raise dividends if the payout cannot be sustained.

1) The desire for stability has led theorists to propound the information content or signaling hypothesis, which states that a change in dividend policy is a signal to the market regarding management's forecast of future earnings. Thus, firms generally have an active policy strategy with respect to dividends.

e. This stability often results in a stock that sells at a higher market price because shareholders perceive less risk in receiving their dividends.

2. **Factors Influencing a Company's Dividend Policy**

   a. Legal Restrictions

      1) Dividends ordinarily cannot be paid out of paid-in capital. A corporation must have a balance in its retained earnings account before dividends can be paid.

   b. Stability of Earnings

      1) A company whose earnings fluctuate greatly from year to year will tend to pay out a smaller dividend during good years so that the same dividend can be paid even if profits are much lower.

         a) For example, a company with fluctuating earnings might pay out $1 every year whether earnings per share are $10 (10% payout rate) or $1 (100% payout rate).

   c. Rate of Growth

      1) A company with a faster growth rate will have a greater need to finance that growth with retained earnings. Thus, growth companies usually have lower dividend payout ratios. Shareholders hope to be able to obtain larger capital gains in the future.

   d. Cash Position

      1) Regardless of a firm's earnings record, cash must be available before a dividend can be paid. No dividend can be declared if all of a firm's earnings are tied up in receivables and inventories.

   e. Restrictions in Debt Agreements

      1) Restrictive covenants in bond indentures and other debt agreements often limit the dividends that a firm can declare.

   f. Tax Position of Shareholders

      1) In corporations, the shareholders may not want regular dividends because the individual owners are in such high tax brackets. They may want to forgo dividends in exchange for future capital gains or wait to receive dividends in future years when they are in lower tax brackets.

      2) However, an accumulated earnings tax is assessed on a corporation if it has accumulated retained earnings beyond its reasonably expected needs.

   g. Residual Theory of Dividends

      1) The amount (residual) of earnings paid as dividends depends on the available investment opportunities and the debt-equity ratio at which cost of capital is minimized. The rational investor should prefer reinvestment of retained earnings when the return exceeds what the investor could earn on investments of equal risk. However, the firm may prefer to pay dividends when investment opportunities are poor and the use of internal equity financing would move the firm away from its ideal capital structure.

3. **Important Dates Relative to Dividends**

   a. The **date of declaration** is the date the directors meet and formally vote to declare a dividend. On this date, the dividend becomes a **liability of the corporation**.

   b. The **date of record** is the date as of which the corporation determines the shareholders who will receive the declared dividend. Essentially, the corporation closes its shareholder records on this date.

      1) Only those shareholders who own the stock on the date of record will receive the dividend. It typically falls from 2 to 6 weeks after the declaration date.

   c. The **date of distribution** is the date on which the dividend is actually paid (when the checks are put into the mail to the investors). The payment date is usually from 2 to 4 weeks after the date of record.

   d. The **ex-dividend date** is a date established by the stock exchanges, such as 2 business days before the date of record. Unlike the other dates previously mentioned, it is not established by the corporate board of directors.

      1) The period between the ex-dividend date and the date of record gives the stock exchange members time to process any transactions so that new shareholders will receive the dividends to which they are entitled.

      2) An investor who buys a share of stock before the ex-dividend date will receive the dividend that has been previously declared. An investor who buys the stock on or after the ex-dividend date (but before the date of record or payment date) will not receive the declared dividend. Instead, the individual who sold the stock will receive the dividend because (s)he owned it on the ex-dividend date.

      3) Usually, a stock price will drop on the ex-dividend date by the amount of the dividend because the new investor will not receive it.

4. **Stock Dividends and Stock Splits**

   a. Stock dividends and splits involve issuance of additional shares to existing shareholders. Shareholders are not taxed until the stock is sold.

   b. A **stock dividend** is an issuance of stock and entails the transfer of a sum from the retained earnings account to a paid-in capital account.

      1) Usually, the corporation wants to give something to the shareholders but without paying out a cash dividend because the funds are needed in the business.

      2) Casual investors may believe they are receiving something of value when in essence their previous holdings are merely being divided into more pieces.

      3) Stock dividends are often used by growing companies that wish to retain earnings in the business while placating shareholders.

c. A **stock split** does not involve any accounting entries. Instead, the existing shares are divided into more shares so that the market price per share will be reduced. The greater the number of shares issued, the lower the resulting share price.

1) EXAMPLE: If a corporation has 1 million shares outstanding, each of which sells for $90, a 2-for-1 stock split will result in 2 million shares outstanding, each of which sells for about $45.

2) **Reverse stock splits** reduce the shares outstanding, thereby increasing the market price per share.

d. Advantages of Issuing Stock Splits and Dividends

1) Because more shares will be outstanding, the price per share will be lower. The lower price per share will induce more small investors to purchase the company's stock. Thus, because demand for the stock is greater, the price may increase.

a) EXAMPLE: In the example above, the additional investors interested in the company at the lower price may drive the price up to $46 or $47, or slightly higher than the theoretically correct price of $45. Consequently, current shareholders will benefit from the split (or dividend) after all.

2) A dividend or split can be a publicity gesture. Because shareholders may believe they are receiving something of value (and actually may be indirectly), they will have a better opinion of their company.

3) Moreover, the more shares a corporation has outstanding, the larger the number of shareholders, who are usually good customers of their company's products.

e. On rare occasions, a firm may use a reverse stock split to raise the market price per share. For example, a 1-for-10 stock split would require shareholders to turn in 10 old shares to receive 1 new share.

1) A reverse stock split usually is issued when a stock is selling for a very low price, such as under $1 per share. It can also be used to reduce the number of shareholders.

5. **Share Repurchases**

a. A share repurchase takes place when a corporation buys its own stock back on the open market. Once in the firm's possession, these shares are called treasury shares.

b. Among the motives for a share repurchase are

1) Mergers
2) Share options
3) Stock dividends
4) Tax advantages to shareholders (e.g., favorable capital gains rates)
5) To increase earnings per share and other ratios (e.g., increase financial leverage)
6) To prevent a hostile takeover
7) To eliminate a particular ownership interest

STUDY UNIT FOUR

VALUATION METHODS AND COST OF CAPITAL

This study unit is the **second of four** on **corporate finance**. The relative weight assigned to this major topic in Part 2 of the exam is **20%**. The four study units are

Study Unit 3: Financial Markets and Types of Securities
Study Unit 4: Valuation Methods and Cost of Capital
Study Unit 5: Managing Current Assets
Study Unit 6: Corporate Restructuring and International Finance

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

4.1 STOCK VALUATION METHODS

1. Stock Valuation

a. The method of valuing a bond shown in item 5. in Study Unit 3, Subunit 3, can also be used for preferred stock.

1) If the preferred dividend rate is less than what is prevalent in the market, then the preferred stock will sell at less than its par value.

2) A dividend rate higher than the market average (based on a similar risk level) will result in the preferred stock selling at a premium.

3) The discount rate used would normally be higher than that used for a bond valuation because a preferred stock is slightly more risky than a bond but has few additional advantages (other than the advantage that preferred dividends are sometimes taxed at lower tax rates than bond interest).

b. Common stocks can be valued in the same way, but the return is based on earnings per share rather than dividend level. Also, with common stocks, the future returns are pure estimates, so there is usually a heavy risk premium incorporated into the calculation.

1) For example, if a bond could be sold at its face value based on an 8% interest rate, a similar preferred stock might necessitate a 10% return because of the increased risk.

2) At the same time, a common stock might have to be valued on an assumed return of 20%. Because investors in common stock fear the risk of never getting future returns, a high risk premium must be used to calculate the common stock's value.

2. The Constant Growth Dividend Discount Model

a. The constant growth dividend discount model (also known as the **dividend growth model**) is a method of arriving at the value of a stock by using **expected (next) dividends per share** and discounting them back to present value. The formula is as follows:

$$\frac{\text{Expected dividend per share}}{\text{Discount rate} - \text{Dividend growth rate}}$$

1) This method is used when dividends are expected to grow at a **constant rate**. If the value obtained using this formula is greater than the stock's current fair market value, then the stock is considered to be undervalued (meaning it is worth more than its fair market value).

b. The expected dividend is calculated using the growth rate of the company.

$$\text{Expected dividend} = \text{Last annual dividend paid} \times (1 + \text{Growth rate})^{t}$$

t = time (years, months, periods, etc.)

c. EXAMPLE: A company recently paid an annual dividend of $10. Dividends have grown steadily at a rate of 5% and are expected to continue indefinitely. Investors require a 12% rate of return (cost of capital) for similar investments. The value of this stock can be calculated as

$$\frac{\$10 \times (1 + .05)}{.12 - .05} = \$150$$

d. EXAMPLE: A company recently paid an annual dividend of $10. Starting next year, it will implement a 5% yearly dividend growth policy. Investors require a 12% return. The value of this stock in 4 years can be calculated as

Step 1 -- Dividend at the end of 4 years = $12.16 [($10 × 1.05)^4]

Step 2 -- $\frac{\$12.16 \times (1.05)}{.12 - .05} = \$182.40$

3. Common Stock with Variable Dividend Growth

a. Dividends do not always grow at a constant rate. This can make stock valuation more difficult. Many companies experience a two-stage growth. In the initial phase, growth can be very rapid and unstable. In the second phase, growth slows down and stabilizes. In these situations, the **two-stage dividend discount model** can be used to effectively calculate the stock value. This calculation requires three steps:

1) Calculate and sum the present value of dividends in the period of high growth.
2) Calculate the present value of the stock based on the period of steady growth, discounting the value back to Year 1.
3) Sum the totals calculated in Step 1 and Step 2.

b. EXAMPLE: Rapido Company expects to pay an annual dividend of $5 at the end of this year. Annual growth is expected to be at 20% for the next 2 years, after which growth is expected to stabilize at 8%. Investors require a 12% rate of return (cost of capital) for similar stock.

Step 1: Calculate and sum the present value of dividends in the period of high growth.

End of Year	Dividend	PV Factor at 12%	PV of Dividend
1	$5.00	.893	$ 4.47
2	$5 × (1 + .20) = $6.00	.797	4.78
3	$6 × (1 + .20) = $7.20	.712	5.13
		Total PV of Dividends	$14.38

Step 2: Calculate the present value of the stock based on the period of steady growth and discount it back to Year 1. This is done using the constant growth dividend discount model. The end of Year 4 dividend is $7.78, calculated by taking the end of Year 3 dividend and multiplying it by 1 plus the Year 4 rate [$7.20 × (1 + .08)].

$$\frac{\text{Dividend per share}}{\text{Discount rate} - \text{Dividend growth rate}}$$

$$\frac{\$\ 7.78}{.12 - .08} = \$194.50$$

Then discount the value back to Year 1, using the present value factor from the Year 3 column in the Present Value table.

$$\$194.50 \times .712 = \$138.48$$

Step 3: Sum the totals calculated in Step 1 and Step 2.

$$\$14.38 + \$138.48 = \$152.86$$

Based on the two-stage dividend discount model, $152.86 is an appropriate value for this stock, given the projected dividends per share and cost of capital.

4. **Preferred Stock Valuation**

a. Preferred stock usually pays a fixed dividend. When this is the case, the value of the stock can be calculated as follows:

$$\frac{\text{Dividend per share}}{\text{Cost of capital}}$$

This formula also can be used when dividends on common stock are not expected to grow.

1) EXAMPLE: Several years ago, a company issued preferred stock that pays a fixed dividend each year of $12. Investors require a 15% rate of return (cost of capital) for similar preferred stock. The value of this stock can be calculated as

$$\frac{\$12}{.15} = \$80$$

5. **Per-Share Ratios**

a. A high price/EBITDA ratio reflects the stock market's positive assessment of the firm's generation of profits through ongoing operations. It measures how much an investor must spend to "buy" a dollar of EBITDA.

Price/EBITDA Ratio

$$\frac{\text{Market price per share}}{\text{EBITDA per share}}$$

1) The origin of the EBITDA measure can be traced back to the technology boom of the 1990s. High tech companies were producing very little income, so investment bankers became creative in how they defined profits.

a) Under the guise of comparability, the argument was that a company with debt that was paying interest expense should not be compared on a profit basis with a closely related company that operated without debt.

i) In other words, two companies could be selling the same product at the same prices and have the same cost structure and operating income, but the company with debt would have a lower net income.

b) The investment bankers' answer to this problem was to simply compare the operating earnings before deducting non-cash expenses.

2) There are numerous benefits to using EBITDA, including operational comparability and as a proxy for cash flows. For example, because depreciation and amortization do not require cash outlays, their exclusion results in a number approximating current cash flows. However, the disadvantages of EBITDA outweigh the advantages.

3) Disadvantages of EBITDA

a) Overstates income: EBITDA distorts reality. From a stockholder's standpoint, investors are most concerned with the level of income and cash flow available after all expenses, including interest expense, depreciation expense, and income tax expense.

b) Neglects working capital requirements: EBITDA may actually be a decent proxy for cash flows for many companies; however, this profit measure does not account for the working capital needs of a business. For example, companies reporting high EBITDA figures may actually have dramatically lower cash flows once working capital requirements (i.e., inventories, receivables, payables) are tabulated.

c) Is not effective for valuation: Investment bankers push for more generous EBITDA valuation multiples because it serves the bankers' and clients' best interests. However, companies with debt deserve lower valuations compared to their debt-free counterparts.

4) Despite EBITDA's comparability benefits, and as much as investment bankers would like to use this metric, beware of EBITDA's shortcomings. Although most analysts are looking for the one-size-fits-all number, the reality of the situation is that a variety of methods need to be used to gain a more accurate financial picture of a company.

b. **Book value per share** equals the amount of net assets available to the common shareholders divided by the number of common shares outstanding.

$$\frac{\text{Total stockholders' equity} - \text{Preferred equity}}{\text{Number of common shares outstanding}}$$

1) When a company has preferred as well as common stock outstanding, the computation of book value per common share must consider potential claims by preferred shareholders, such as whether the preferred stock is cumulative and in arrears, or participating. It must also take into account whether the call price (or possibly the liquidation value) exceeds the carrying amount of the preferred stock.
2) The limitation of book value per share is that it is a valuation based solely on the amounts recorded in the books.
    a) Unlike market value, book value does not consider future earnings potential in determining a company's valuation.
    b) The recorded values of assets on the books are subject to accounting estimates (e.g., choice of depreciation method) that may vary across companies within the same industry. Consequently, net assets may be overstated if estimates are inaccurate.
    c) Additionally, those same assets may be pledged as collateral on a loan. However, a pledge of collateral is not recorded as a liability on the books. Thus, book value will not account for this potential liability.
    d) A well-managed firm's stock should sell at high multiples of its book value.

c. The **price-earnings (P/E) ratio** equals the market price per share of common stock divided by EPS (or total market value divided by net income).

$$\frac{\text{Market price}}{\text{EPS}}$$

1) Growth companies are likely to have high P/E ratios. A high P/E ratio reflects the stock market's positive assessment of the firm's earnings quality and prospects.
2) Because of the widespread use of the P/E ratio and other measures, the relationship between accounting data and stock prices is crucial. Thus, managers have an incentive to "manage earnings," sometimes by fraudulent means.
    a) A decrease in investors' required rate of return will cause share prices to go up, which will result in a higher P/E ratio.
    b) A decline in the rate of dividend growth will cause the share price to decline, which will result in a lower P/E ratio.
    c) An increasing dividend yield indicates that share price is declining, which will result in a lower P/E ratio.

d. **Market-to-book ratio** (also called the price-book ratio).

$$\frac{\text{Market price per share}}{\text{Book value per share}}$$

1) Well-managed firms should sell at high multiples of their book value, which reflects historical cost.

e. **Price-sales ratio** is preferred by some analysts over profit ratios.

$$\frac{\text{Market price per share}}{\text{Sales per share}}$$

1) Analysts who use the price-sales ratio believe that strong sales are the basic ingredient of profits and that sales are the item on the financial statements least subject to manipulation.

6. Earnings per Share (EPS)

a. EPS is probably the most heavily relied-upon performance measure used by investors. EPS states the amount of current-period earnings that can be associated with a single share of a corporation's common stock.

1) EPS is only calculated for common stock because common shareholders are the residual owners of a corporation. Since preferred shareholders have superior claim to the firm's earnings, amounts associated with preferred stock must be removed during the calculation of EPS.

b. A corporation is said to have a simple capital structure if the following two conditions apply:

1) The firm has only common stock; i.e., there are no preferred shareholders with a superior claim to earnings in the form of dividends; and

2) The firm has no dilutive potential common stock.

a) Potential common stock (PCS) is a security or other contract that may entitle the holder to obtain common stock. Examples include convertible securities, stock options and warrants, and contingently issuable common stock.

b) Potential common stock is said to be dilutive if its inclusion in the calculation of EPS results in a reduction of EPS.

c. A firm with a simple capital structure only has to report a single category of EPS, called basic earnings per share (BEPS).

1) A firm with preferred stock or dilutive potential common stock must report two categories of EPS, BEPS and diluted earnings per share (DEPS).

d. **Earnings per share (EPS)** equals net income available to common shareholders divided by the average number of shares outstanding for the period.

$$\frac{\text{Net income available to common shareholders}}{\text{Weighted-average common shares outstanding}}$$

1) Net income available to common shareholders is net income minus preferred dividends.

2) Both basic and diluted EPS must be presented.

3) Stock dividends and stock splits are deemed to have occurred at the beginning of the period.

EXAMPLE 4-1 BEPS

Assume net income is $1,900,000.

Date	Stock Transactions	Common Shares Outstanding		Restate for Stock Div.		Restate for Stock Split		Portion of Year		Weighted Average
Jan 1	Beginning balance	240,000	×	1.5	×	2	×	2 ÷ 12	=	120,000
Mar 1	Issued 60,000 shares	300,000	×	1.5	×	2	×	5 ÷ 12	=	375,000
Jun 1	Distributed 50% stock dividend	450,000								
Aug 1	Repurchased 20,000 shares	430,000			×	2	×	3 ÷ 12	=	215,000
Oct 1	Distributed 2-for-1 stock split	860,000								
Nov 1	Issued 80,000 shares	940,000					×	2 ÷ 12	=	156,667
	Total									**866,667**

The **BEPS** is $2.19 ($1,900,000 ÷ $866,667).

e. **Diluted Earnings Per Share (DEPS)**

1) The numerator is increased by the amounts that would not have had to be paid if dilutive potential common stock had been converted, namely, dividends on convertible preferred stock and after-tax interest on convertible debt.

2) The denominator is increased by the weighted-average number of additional shares of common stock that would have been outstanding if dilutive potential common stock had been converted.

7. **Other Market-Based Measures**

a. Increasing shareholder wealth is the fundamental goal of any corporation. Four common ratios measure the degree of success toward this goal.

b. Earnings yield is the rate of return on the purchase price of a share of common stock. It is the reciprocal of the P/E ratio and thus measures the amount of earnings an investor expects to receive per dollar invested.

Earnings Yield

$$\frac{\text{Earnings per share}}{\text{Market price per share}}$$

1) The earnings yield can be compared by investors to other types of investments to determine whether a given stock is comparable to other stocks in the industry or to alternative uses of the investment money.

c. The dividend payout ratio measures what portion of accrual-basis earnings was actually paid out to common shareholders in the form of dividends.

Dividend Payout Ratio

$$\frac{\text{Dividends to common shareholders}}{\text{Income available to common shareholders}}$$

1) Growth companies tend to have a low payout, preferring to use earnings to continue growing the firm.

d. A related ratio is the dividend yield.

Dividend Yield

$$\frac{\text{Dividend per share}}{\text{Market price per share}}$$

1) Various investors have different desires with respect to dividend yield. Historically, many long-term investors wanted a low dividend yield because capital gains were taxed at a lower tax rate than dividends; thus, letting the earnings accumulate within the company resulted in a lower overall tax expense.

a) However, in recent years, the tax rate on dividends has been as low or lower than that on capital gains; thus, a high dividend yield has come into vogue.

2) Also, investors in different circumstances have different perspectives on dividend yield. For example, a retiree wants regular income and therefore wants to see a high dividend yield. A person who is years away from retirement would prefer a lower dividend yield with the earnings reinvested in the business.

e. Shareholder return measures the return on a purchase of stock.

Shareholder Return

$$\frac{\text{Ending stock price} - \text{Beginning stock price} + \text{Annual dividends per share}}{\text{Beginning stock price}}$$

4.2 OPTIONS AND DERIVATIVES

1. Overview

a. A **derivative instrument** is an investment transaction in which the parties' gain or loss is derived from some other economic event, for example, the price of a given stock, a foreign currency exchange rate, or the price of a certain commodity.

1) One party enters into the transaction to speculate (incur risk), and the other enters into it to hedge (avoid risk).

b. Derivatives are a type of financial instrument, along with cash, accounts receivable, notes receivable, bonds, preferred shares, common shares, etc. Derivatives are not, however, claims on business assets, such as those represented by equity securities.

2. Hedging

a. Hedging is the process of using offsetting commitments to minimize or avoid the impact of adverse price movements.

b. A person who would like to sell an asset in the future has a **long position** in the asset because (s)he benefits from a rise in value of the asset.

1) To protect against a decline in value, the owner can enter into a short hedge, i.e., obtain an instrument whose value will rise if the asset's value falls.

2) EXAMPLE: A soybean farmer hopes that the price of soybeans will rise by the time her crop is ready to go to market. The farmer is thus long in soybeans. To protect against the possibility that the price will fall in the meantime, she can obtain a short hedge. This arrangement is a cash-flow hedge because the intent of the transaction is to avoid risks attributable to future cash flows.

c. A person who would like to buy an asset in the future has a **short position** in the asset because (s)he benefits from a fall in value of the asset.

1) To protect against a rise in value, the party can enter into a long hedge, i.e., obtain an instrument whose value will rise if the asset's value rises.

2) EXAMPLE: An agricultural wholesaler hopes that the price of soybeans will fall by the time farmers are bringing their harvests to the warehouse. The wholesaler is thus short in soybeans. To protect against the possibility that the price will rise in the meantime, the wholesaler can obtain a long hedge.

3) A fair-value hedge is an instrument that hedges the exposure to changes in fair value of an asset or liability.

d. A **natural hedge** relies on normal operations to mitigate risk. It does not involve sophisticated financial products. For example, financing a purchase of long-lived equipment over the same period as the life of the equipment is a form of hedge.

3. **Options**

   a. Options are the most common form of derivative.

      1) A party who buys an option has bought the right to demand that the counterparty (the seller or “writer” of the option) perform some action on or before a specified future date.

      2) The exercise of an option is always at the discretion of the option holder (the buyer) who has, in effect, bought the right to exercise the option or not. The seller of an option has no choice; (s)he must perform if the holder chooses to exercise.

   b. An option has an expiration date after which it can no longer be exercised.

      1) An option that can be exercised only on its expiration date is referred to as a European option.

      2) An option that grants the buyer the right to exercise anytime on or before expiration is an American option.

   c. Determining the correct price for an option is a complex calculation, discussed in item 7. in this subunit.

      1) The **exercise price** (or strike price) is the price at which the owner can purchase or sell the asset underlying the option contract.

      2) The **option price**, also called **option premium**, is the amount the buyer pays to the seller to acquire an option.

   d. An option can be covered or uncovered.

      1) A covered option is one in which the seller (writer) already has possession of the underlying.

      2) A naked (uncovered) option is a speculative instrument; since the writer does not hold the underlying, (s)he may have to acquire it at an unknown price in the future to satisfy his or her obligations under the option contract.

   e. Options can be classified by their underlying assets.

      1) A stock option is an option whose underlying asset is a traded stock.

      2) An index option is an option whose underlying asset is a market index. If exercised, settlement is made by cash since delivery of the underlying is impossible.

      3) Long-term equity anticipation securities (LEAPS) are examples of long-term stock options or index options, with expiration dates up to 3 years away.

      4) Foreign currency options give the holder the right to buy a specific foreign currency at a designated exchange rate.

4. **Call Options**

   a. A call option gives the buyer (holder) the **right to purchase** (i.e., the right to "call" for) the underlying asset (stock, currency, commodity, etc.) at a fixed price.

      1) If the price of the underlying rises above the exercise price, the option is said to be "in-the-money." The holder can exercise his or her option and buy the underlying at a bargain price.

         a) The **intrinsic value** of a call option is the price of the underlying asset less the exercise price. Intrinsic value cannot be less than zero.

      2) If the value of the underlying is less than the exercise price of the option, the option is "out-of-the-money," or not worth exercising.

      3) If the value of the underlying is equal to the exercise price of the option, the option is said to be "at-the-money."

   b. Thus, a call option represents a **long position** to the holder because the holder benefits from a price increase.

      1) The seller (writer) of a call option hopes the price of the underlying will remain below the exercise price because (s)he must make the underlying available to the holder at the strike price, regardless of how much the seller must pay to obtain it. The seller of a call option is thus taking a short position.

   c. The buyer's gain (loss) necessarily mirrors the seller's loss (gain). The amount of gain and loss on a call option can be calculated as follows:

      1) Buyer/holder (long position):

Units of underlying × (Excess of market price over exercise price – Option price)

      2) Seller/writer (short position):

Units of underlying × (Option price – Excess of market price over exercise price)

   d. EXAMPLE of an in-the-money call option: Tapworth Co. bought call options giving it the right to buy 100 shares of PanGlobal Corp. stock in 30 days at $100 per share. Smith Co. sold these options to Tapworth for $3 per share. On Day 30, PanGlobal stock is trading at $105 and Tapworth exercises all of its options (since the options give Tapworth the right to buy PanGlobal stock at a better-than-market price). Tapworth's and Smith's respective gains and losses on the transaction can be calculated as follows:

Buyer's gain (loss) = 100 call options × [($105 – $100) – $3] = $200 gain
Seller's gain (loss) = 100 call options × [$3 – ($105 – $100)] = $(200) loss

   e. EXAMPLE of an out-of-the-money call option: On Day 30, PanGlobal stock is trading at $97 and Tapworth's options are worthless (since having the right to buy PanGlobal at $100 gives Tapworth no advantage over buying on the open market). Tapworth's and Smith's respective gains and losses on the transaction can be calculated as follows:

Buyer's gain (loss) = 100 call options × ($0 – $3) = $(300) loss
Seller's gain (loss) = 100 call options × ($3 – $0) = $300 gain

f. The relationship between the buyer and seller of a call option can be depicted in the following diagram:

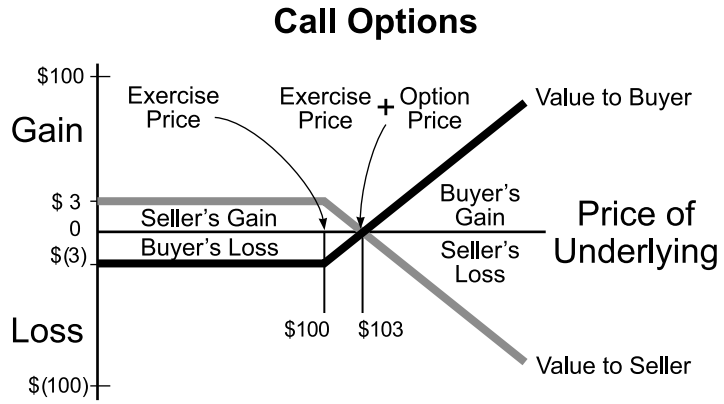


Figure 4-1

Clearly, the accurate valuation of options is crucial.

5. **Put Options**

a. A put option gives the buyer (holder) the **right to sell** (i.e., the right to "put" onto the market) the underlying asset (stock, currency, commodity, etc.) at a fixed price.

1) If the price of the underlying falls below the exercise price, the option is said to be "in-the-money." The holder can exercise his or her option and compel the counterparty to buy the underlying at a price higher than that prevailing in the market.

a) The **intrinsic value** of a put option is the exercise price less the price of the underlying asset. Intrinsic value cannot be less than zero.

2) If the value of the underlying is higher than the exercise price of the option, the option is "out-of-the-money," or not worth exercising.

3) If the value of the underlying is equal to the exercise price of the option, the option is said to be "at-the-money."

b. Thus, a put option represents a **short position** to the holder because the holder benefits from a price decrease.

1) The seller (writer) of a put option hopes the price of the underlying investment will remain above the exercise price, since (s)he must buy from the holder at the strike price, regardless of the fact that the same underlying can be obtained for less in the open market. The seller of a put option is thus taking a long position.

c. The buyer's gain (loss) necessarily mirrors the seller's loss (gain). The amount of gain and loss on a put option can be calculated as follows:

1) Buyer/holder (short position):

Units of underlying × (Excess of exercise price over market price – Option price)

2) Seller/writer (long position):

Units of underlying × (Option price – Excess of exercise price over market price)

d. EXAMPLE of an in-the-money put option: Tapworth Co. bought put options giving it the right to sell 100 shares of PanGlobal Corp. stock in 30 days at $100 per share. Smith Co. sold these options to Tapworth for $3 per share. On Day 30, PanGlobal stock is trading at $92 and Tapworth exercises all of its options (since the options give Tapworth the right to sell PanGlobal stock at a price higher than the one prevailing in the market). Tapworth's and Smith's respective gains and losses on the transaction can be calculated as follows:

Buyer's gain (loss) = 100 put options × [($100 – $92) – $3] = $500 gain
Seller's gain (loss) = 100 put options × [$3 – ($100 – $92)] = $(500) loss

e. EXAMPLE of an out-of-the-money put option: On Day 30, PanGlobal stock is trading at $104 and Tapworth's options are worthless (since having options to sell PanGlobal at $100 gives Tapworth no advantage over selling on the open market). Tapworth's and Smith's respective gains and losses on the transaction can be calculated as follows:

Buyer's gain (loss) = 100 put options × ($0 – $3) = $(300) loss
Seller's gain (loss) = 100 put options × ($3 – $0) = $300 gain

f. The relationship between a buyer and seller of a put option can be depicted in the following diagram:

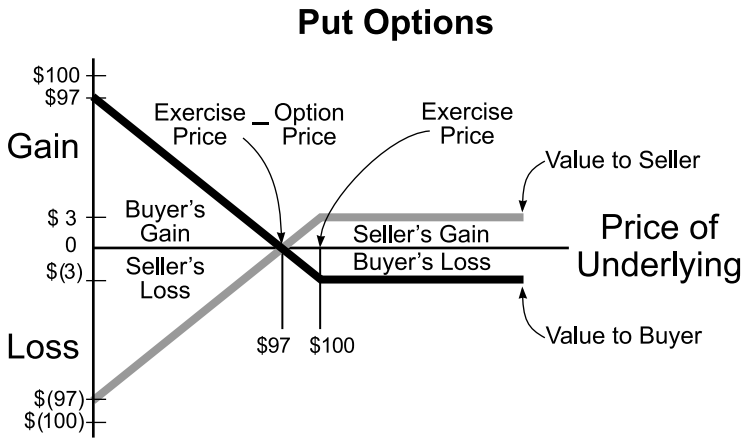


Figure 4-2

6. Put-Call Parity

a. The put-call parity theorem mathematically depicts the combinations of investment strategies that can be devised using European options (i.e., those with a single exercise date). The two sides of this equation represent combinations with identical outcomes (given identical exercise prices for the put and the call and identical expiration dates):

Value of call + PV of exercise price* = Value of put + Value of underlying

* Discounted at the risk-free rate

1) Look first at the left side of the equation. The buyer of a call may wish to hedge against the loss that (s)he will incur if the market price of the underlying fails to rise sufficiently. The buyer can do this by investing the present value of the exercise price in a safe investment. If the option is out-of-the-money on the expiration date, the option holder has the return from this safe investment to make up for the loss.

2) Look next at the right side of the equation. The buyer of a put may wish to hedge against the loss that (s)he will incur if the market price of the underlying fails to fall sufficiently. The buyer can do this by buying the underlying at the same time as the option. If the option is out-of-the-money on the expiration date, the option holder can simply sell the underlying at the going market price to make up for the loss.

b. The basic formula can be restated to depict the investment strategy that provides a **risk-free return**:

PV of exercise price = Value of put + Value of underlying – Value of call

1) In other words, the combination of buying a put option, buying the underlying, and selling a call option provides the same return as investing the present value of the exercise price at the risk-free rate. Knowledge of these relationships can help investors devise appropriate option strategies.

7. **Valuing an Option**

a. The two most well-known models for valuing options are the Black-Scholes formula for call options and the binomial method. The equations themselves are extremely complex and beyond the scope of an accounting text, but some general statements can be made about the factors that affect the outcomes.

1) **Exercise price.** In general, the buyer of a call option benefits from a low exercise price. Likewise, the buyer of a put option generally benefits from a high exercise price.

a) Thus, an increase in the exercise price of an option results in a decrease in the value of a call option and an increase in the value of a put option.

2) **Price of underlying.** As the price of the underlying increases, the value of a call option also will increase; the exercise price is more and more of a bargain with each additional dollar in the price of the underlying.

a) By the same token, the value of a put option will decrease as the price of the underlying increases since there is no advantage in selling at a lower-than-market price.

3) **Interest rates.** Buying a call option is like buying the underlying on credit. The purchase of the option is a form of down payment. If the option is exercised in a period of rising interest rates, the exercise price is paid in inflated dollars, making it more attractive for the option holder.

a) A rise in interest rates will therefore result in a rise in the value of a call option and a fall in the value of a put option.

4) **Time until expiration.** The more time that passes, the riskier any investment is.

a) Thus, an increase in the term of an option (both calls and puts) will result in an increase in the value of the option.

5) **Volatility of price of underlying.** The price of an asset can drop no lower than zero. Thus, there is a natural limit to the potential downside loss for either party to an option transaction. On the upside, however, there is much greater flexibility. Thus, parties to an option transaction will prefer volatility.

a) An increase in the volatility of the price of the underlying will result in an increase in the value of the option (both calls and puts).

b. These factors and their effects can be summarized as follows:

Increase in	Value of call option will	Value of put option will
Exercise price of option	Decrease	Increase
Price of underlying	Increase	Decrease
Interest rates	Increase	Decrease
Time until expiration	Increase	Increase
Volatility of price of underlying	Increase	Increase

8. **Forward Contracts**

a. One method of mitigating risk is the simple forward contract. The two parties agree that, at a set future date, one of them will perform and the other will pay a specified amount for the performance.

1) A common example is that of a retailer and a wholesaler who agree in September on the prices and quantities of merchandise that will be shipped to the retailer's stores in time for the winter holiday season. The retailer has locked in a price and a source of supply, and the wholesaler has locked in a price and a customer.

b. The party that has contracted to buy the underlying at a future date has taken a long position, and the party that has contracted to deliver the underlying has taken a short position. The payoff structure is similar to that for options:

1) If the market price of the underlying on the delivery date is higher than the contractual price, the party that has taken the long position benefits, since (s)he has locked in a lower price.

2) If the market price of the underlying on the delivery date is lower than the contractual price, the party that has taken the short position benefits, since (s)he is entitled to receive higher payment for the underlying than the amount currently prevailing in the market.

c. Note the significant difference between a forward contract and an option: In a contract, both parties must meet their contractual obligations, i.e., to deliver merchandise and to pay. Neither has the option of nonperformance.

9. **Futures Contracts**

   a. A forward contract like the one described on the previous page is appropriate for a retailer and a wholesaler, who are exchanging very specific merchandise and can take the time to address all the facets of the contract.

      1) Traders in undifferentiated commodities, such as grains, metals, fossil fuels, and foreign currencies, often do not have this luxury. The trading process of these products is eased by the use of futures contracts.

      2) A futures contract is a commitment to buy or sell an asset at a fixed price during a specific future month; unlike with a forward contract, the counterparty is unknown.

   b. Futures contracts are actively traded on futures exchanges.

      1) Because futures contracts are for delivery during a given month, not a specific day, they are more flexible arrangements than forward contracts.

      2) The clearinghouse randomly matches sellers who will deliver during a given month with buyers who are seeking delivery during the same month.

   c. Because futures contracts are actively traded, the result is a liquid market in futures that permits buyers and sellers to net out their positions.

      1) For example, a party who has sold a contract can net out his or her position by buying a futures contract. In contrast, a person holding a forward contract does not enjoy this liquidity.

   d. Another distinguishing feature of futures contracts is that their prices are marked to market every day at the close of the day to each person's account. Thus, the market price is posted at the close of business each day.

      1) A mark-to-market provision minimizes a futures contract's chance of default because profits and losses on the contracts must be received or paid each day through a clearinghouse.

      2) This requirement of daily settlement minimizes default and is necessary because futures contracts are sold on margin (i.e., they are highly leveraged).

   e. Another difference is that a party to a forward contract typically expects actual delivery; futures contracts are generally used as financial tools to offset the risks of changing economic conditions. Thus, the two parties simply exchange the difference between the contracted price and the market price prior to the expiration date.

      1) This is why a trader who does not want to accidentally have to settle in a certain month buys a future for the following month.

10. **Swaps**
    a. Swaps are contracts by which the parties exchange cash flows. Three types are common:
        1) **Interest rate swaps** are agreements to exchange interest payments based on one interest structure for payments based on another structure.
            a) For example, a firm that has fixed debt service charges may enter into a swap with a counterparty that agrees to supply the first party with interest payments based on a floating rate that more closely tracks the first party's revenues.
            b) These agreements are highly customized.
        2) **Currency swaps** are agreements to exchange cash flows denominated in one currency for cash flows denominated in another.
            a) For example, a U.S. firm with revenues in euros has to pay suppliers and workers in dollars, not euros. To minimize exchange-rate risk, it might agree to exchange euros for dollars held by a firm that needs euros.
            b) The exchange rate will be an average of the rates expected over the life of the agreement.
        3) **Credit default swaps** are agreements whereby one of the parties indemnifies the other against default by a third party.
            a) For example, a large bank may agree to pay a constant stream of cash to another bank as long as one of the first bank's major debtors remains current on its loans. If the customer defaults, the second bank covers the first bank's loss. One of the parties is, in effect, providing loan default insurance to the other party.
            b) Unlike interest rate swaps, these agreements are usually bundled into large portfolios.
    b. The swap spread is the market-determined additional yield that compensates counterparties who receive fixed payments in a swap for the credit risk involved in the swap. The swap spread will differ with the creditworthiness of the counterparty.
    c. Most swaps are priced to be at-the-money at inception, meaning that the value of the two sets of cash flows being exchanged is the same. Naturally, as interest rates, currency exchange rates, and credit risks change, the values of the swaps will change.
11. Options can be invested in as a speculative form of investment. Alternatively, if they are combined with other positions, they can also be used in hedging.

4.3 COST OF CAPITAL -- CURRENT

1. Overview

a. Investors provide funds to corporations with the understanding that management will deploy those funds in such a way that the investor will ultimately receive a return.

1) If management does not generate the **investors' required rate of return**, the investors will take their funds out of the corporation and redirect them to more profitable ventures.

2) For this reason, the investors' required rate of return (also called their opportunity cost of capital) in turn becomes the firm's cost of capital.

b. A firm's cost of capital is typically used to discount the future cash flows of long-term projects, since investments with a return higher than the cost of capital will increase the value of the firm, i.e., shareholders' wealth. (The cost of capital is not used in connection with working capital because short-term needs are met with short-term funds.)

2. Component Costs of Capital

a. As described in Study Unit 3, Subunits 3 and 4, a firm's financing structure consists of three components: long-term debt, preferred equity, and common equity (retained earnings are treated as part of common equity in this analysis for reasons given below). The rate of return demanded by holders of each is the component cost for that form of capital.

1) The component cost of **debt** is the after-tax interest rate on the debt (interest payments are tax-deductible by the firm):

Effective rate × (1.0 – Marginal tax rate)

2) The component cost of **preferred stock** is computed using the dividend yield ratio:

Cash dividend on preferred stock ÷ Market price of preferred stock

3) The component cost of **common stock** is also computed using the dividend yield ratio:

Cash dividend on common stock ÷ Market price of common stock

4) In theory, the component cost of **retained earnings** is the same as that for common stock. If the firm has no profitable use for retained earnings, it should be distributed to the common shareholders in the form of dividends so they can find their own investments. However, the cost of retained earnings normally is lower than the cost of common stock because of issuance costs.

b. Providers of equity capital are exposed to more risk than are lenders because (1) the firm is not legally obligated to pay them a return and (2) in case of liquidation, equity investors trail creditors in priority. To compensate for this higher level of risk, equity investors demand a higher return, making equity financing more expensive than debt.

CMA candidates will need to be able to determine the weighted-average cost of capital (WACC) and how it is applied in capital structure decisions. On the CMA exam, you will be expected to calculate WACC and the marginal cost of capital and demonstrate that you understand how they will affect investment decisions for a business.

3. **Weighted-Average Cost of Capital**

   a. Corporate management usually designates a **target capital structure** for the firm, i.e., the proportions that each component of capital should comprise in the overall combination. An example might be 10% debt, 20% preferred stock, and 70% common stock.

      1) EXAMPLE: The following excerpt is from a firm's most recent balance sheet:

Component	Carrying Amount	Proportions
11.4% Bonds Payable	$ 2,200,000	10.00%
11.5% Preferred Stock	4,600,000	20.91%
Common Stock	14,000,000	63.64%
Retained Earnings	1,200,000	5.45%
Totals	**$22,000,000**	**100.00%**

   b. A firm's **weighted-average cost of capital (WACC)** is a single, composite rate of return on its combined components of capital. The weights are based on the components' respective market values, not book values, because market value provides the best information about investors' expectations.

      1) EXAMPLE: In order to calculate its WACC, the firm must first determine the component costs of long-term debt and preferred equity. The company has historically provided a 16% return on common equity. The firm is in a 35% marginal tax bracket. Assume that the market price of the preferred stock is the same as the book value.

Component cost of long-term debt = Effective rate × (1.0 – Marginal tax rate)
= 11.4% × (1.0 – .35)
= 7.41%

Component cost of preferred equity = Cash dividend ÷ Market price of stock
= ($4,600,000 × 11.5%) ÷ $4,600,000
= 11.5%

The firm can now determine its WACC by multiplying the cost of each component of capital by the proportion of total market value represented by that component.

Component	(1) Market Value	(2) Weight		(3) Component Cost		(2) × (3) Weighted Cost
11.4% Bonds Payable	$ 2,200,000	10.00%	×	7.41%	=	0.7410%
11.5% Preferred Stock	4,600,000	20.91%	×	11.5%	=	2.4047%
Common Stock	14,000,000	63.64%	×	16.0%	=	10.1824%
Retained Earnings	1,200,000	5.45%	×	16.0%	=	0.8727%
Totals	**$22,000,000**	**100.00%**				**14.2008%**

Generally, the component cost of retained earnings is considered to be the same as that for common stock.

The firm will invest in projects that have an expected return that is greater than 14.2008% (firm's WACC). These projects will generate additional free cash flow and will create positive net present value for the shareholders.

c. A formula to calculate the after-tax WACC where there is no preferred stock is

$$WACC = \frac{E}{V} \times R_e + \frac{D}{V} \times R_d \times (1 - T)$$

R_e = Cost of equity
R_d = Cost of debt
E = Market value of the firm's equity
D = Market value of the firm's debt
T = Corporate tax rate
V = D + E = Capital used to generate profits

EXAMPLE 4-2 WACC

The firm provides the following information:

Capital used to generate profits	
50% debt, 50% equity	$1,200
Cost of equity	15%
Cost of debt	5%
Corporate tax rate	40%

$$WACC = \frac{(1{,}200 \times 50\%)}{1{,}200} \times 15\% + \frac{(1{,}200 \times 50\%)}{1{,}200} \times 5\% \times (1 - 40\%) = 0.09 = 9\%$$

d. Standard financial theory provides a model for the **optimal capital structure** of every firm. This model holds that shareholder wealth-maximization results from **minimizing the weighted-average cost of capital**. Thus, the focus of management should not be on maximizing earnings per share (EPS can be increased by taking on more debt, but debt increases risk).

1) The relevant relationships are depicted below:

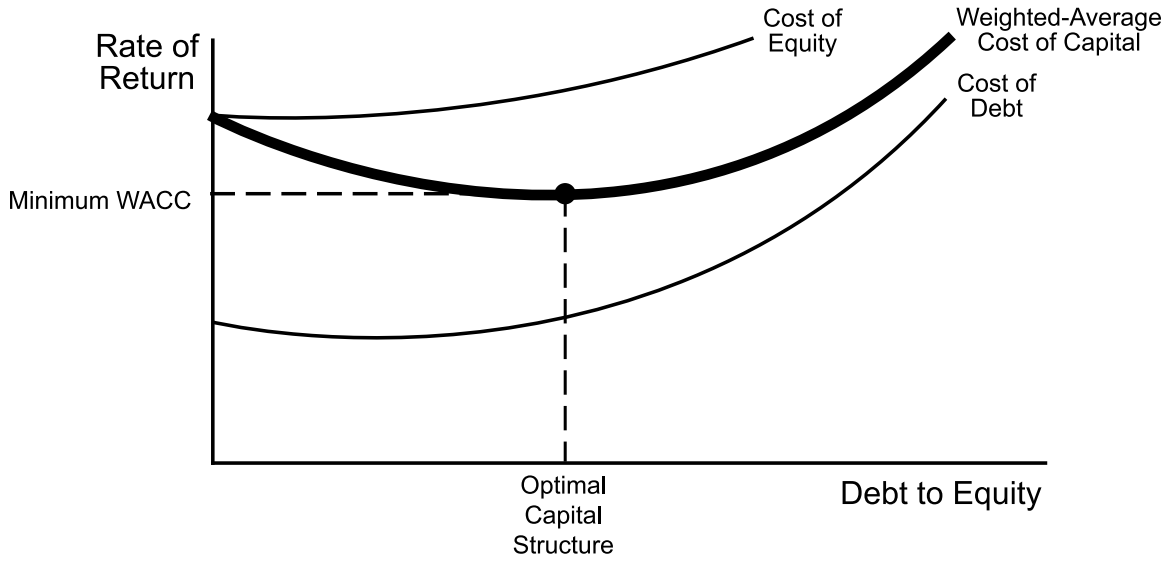


Figure 4-3

Ordinarily, firms cannot identify this optimal point precisely. Thus, they should attempt to find an optimal range for the capital structure.

4. **Impact of Income Taxes on Capital Structure and Capital Decisions**

   a. Taxes are an important consideration because they can be anywhere from 25% to 50% of all costs.

   b. Corporate capital gains are taxed at a regular rate, and the capital gains of individuals are currently 16% or less.

   c. A dividends-received deduction renders free from taxation anywhere from 70% to 100% of dividends received by one company from investments in the stock of another company. This deduction prevents or reduces double taxation. It also encourages one company to invest in the stock of another company. However, a conflict may arise between the desires of corporate owners and individual owners in that individuals may sometimes prefer capital gains, while corporate owners would prefer dividends.

   d. Interest is a tax-deductible expense of the debtor company, but dividends are not deductible. Thus, a company needing capital would prefer to issue bonds rather than stock because the interest would be deductible. As a result, the issuer would prefer to issue debt because the interest is deductible, but the investor would prefer stock because interest on debt is fully taxable while the return on stock is only partially taxable or taxable at special low rates. Similarly, a corporation may be reluctant to issue common stock because it does not want to share control of the company, but the investor may prefer stock because of the favorable tax treatment.

   e. Multinational corporations frequently derive income from several countries. The government of each country in which a corporation does business may enact statutes imposing one or more types of tax on the corporation, so any capital decision affecting multiple countries must consider the tax provisions of each nation.

4.4 COST OF CAPITAL -- NEW

1. Marginal Cost of Capital

a. While internally generated capital provides a supply of needed capital, a firm cannot rely solely on retained earnings to fund new projects.

1) Retained earnings alone are rarely sufficient to fund all of a corporation's long-term needs.

2) Also, maintaining the firm's optimal capital structure may require the issuance of new securities at some point.

b. The marginal cost of capital is the weighted-average cost to the firm of the next dollar of new capital raised after existing internal sources are exhausted.

1) Each additional dollar raised becomes increasingly expensive as investors demand higher returns to compensate for increased risk.

2) EXAMPLE: A company has determined that it requires $4,000,000 of new funding to fulfill its plans. Retained earnings of $1,200,000 are insufficient, and the firm wants to maintain its capital structure of 10% long-term debt, 20% preferred stock, and 70% common stock (which includes retained earnings). The cost of raising the $2,800,000 shortfall between retained earnings and funding needs will be at some rate above the current WACC.

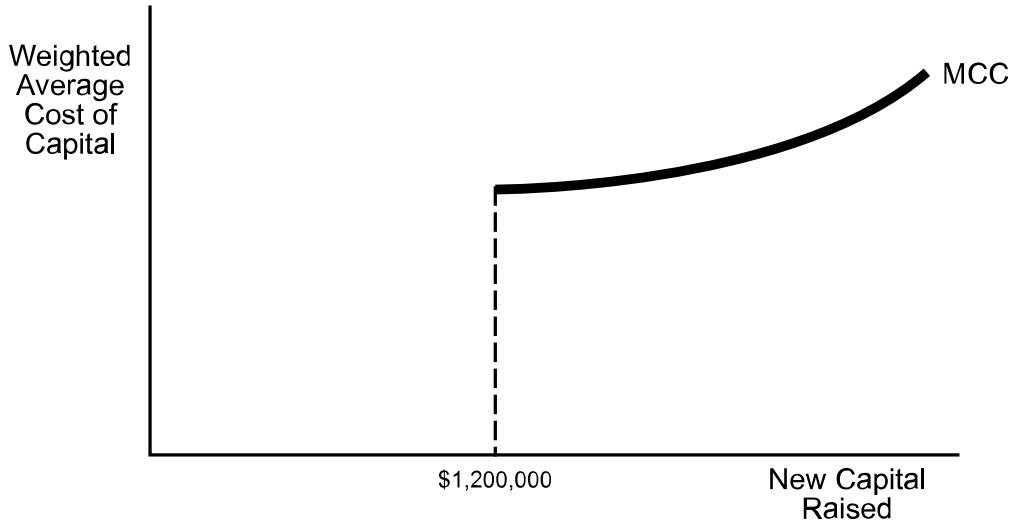


Figure 4-4

2. Cost of New Capital

a. The cost of new capital (also called external capital) is the ratio of what the firm must pay to what the firm gets.

1) Because of interest rate fluctuations, the **cost of new debt** will rarely be the historical, or embedded, rate. Also, if the firm's debt load is already considerable, new debtholders will demand a higher interest rate to compensate for the increased risk.

Annual interest ÷ Net issue proceeds

a) As tax rates rise, the deductibility of interest makes debt a more attractive financing option.

2) All new issues of equity securities involve the payment of flotation costs, which reduce the proceeds received, thereby raising the cost of capital. The **cost of new preferred stock** is thus calculated:

Next dividend ÷ Net issue proceeds

3) The **cost of new common stock** is commonly calculated using the dividend growth model (also known as the discounted cash flow method), which anticipates that common shareholders will demand steadily increasing dividends over time (while assuming that the dividend payout ratio will remain constant).

(Next dividend ÷ Net issue proceeds) + Dividend growth rate

a) An issue of new common stock is used mostly by young, growing companies. Mature firms rarely issue new common stock to the general public because of the issue costs involved and the depressing influence a new issue can have on the stock's price.

b. EXAMPLE: Retained earnings are sufficient to cover 30% of the firm's new capital needs ($1,200,000 ÷ $4,000,000). The rest must come from the other three components of capital.

The company can issue new debt at a cost of 12.6%. The firm can also sell $100 par value preferred stock that pays a 14% dividend and has $5-per-share flotation costs. The $1,200,000 balance of retained earnings will be used, and the remainder will come from an issue of common stock. The new common stock will pay an $8 dividend that is expected to grow 2% annually. The company's common stock is currently trading at $55 per share, and the new issue will have $3-per-share flotation costs.

Cost of new long-term debt = 12.6% (given)

Cost of new preferred stock = Next dividend ÷ Net issue proceeds
= $14 ÷ ($100 – $5)
= 14.7%

Cost of new common stock = (Next dividend ÷ Net issue proceeds) + Dividend growth rate
= [$8 ÷ ($55 – $3)] + 2%
= 15.4% + 2%
= 17.4%

Cost of retained earnings = (8 ÷ 55) + 2% = 16.55%

If the company maintains its current capital structure, the weighed-average cost of capital for this round of capital formation is calculated as follows:

Component	Weight		Cost of Capital		Weighted Cost
New long-term debt	10%	×	12.6%	=	1.26%
New preferred stock	20%	×	14.7%	=	2.94%
New common stock	40%	×	17.4%	=	6.96%
Retained earnings	30%	×	16.6%	=	4.98%
Total					**16.14%**

STUDY UNIT FIVE

MANAGING CURRENT ASSETS

This study unit is the **third of four** on **corporate finance**. The relative weight assigned to this major topic in Part 2 of the exam is **20%**. The four study units are

Study Unit 3: Financial Markets and Types of Securities
Study Unit 4: Valuation Methods and Cost of Capital
Study Unit 5: Managing Current Assets
Study Unit 6: Corporate Restructuring and International Finance

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

5.1 WORKING CAPITAL

1. Definitions

a. Working capital finance concerns the optimal level, mix, and use of **current assets** and the means used to acquire them, notably **current liabilities**.

1) The objective is to minimize the cost of maintaining liquidity (quick convertibility to cash to pay current obligations) while guarding against the risk of insolvency (inability to pay obligations as they come due).

2) Working capital policy applies to short-term decisions, and capital structure finance applies to long-term decisions.

3) Net working capital equals current assets minus current liabilities.

Net working capital = Current assets – Current liabilities

b. Permanent working capital is the minimum level of current assets maintained by a firm.

1) Permanent working capital should increase as the firm grows.

2) Permanent working capital generally is financed with long-term debt. Financing with short-term debt is risky because assets may not be liquidated in time to pay the debt, interest rates may rise, and loans may not be renewed.

c. Temporary working capital fluctuates seasonally.

2. Working Capital Policy

a. A firm that adopts a **conservative** working capital policy seeks to minimize liquidity risk by increasing working capital.

   1) The firm seeks to ensure that adequate cash, inventory, and supplies are available and payables are minimized.

   2) The firm forgoes the potentially higher returns from investing in long-term assets and instead keeps that additional working capital available.

   3) This policy is reflected in a higher current ratio (Current assets ÷ Current liabilities) and acid-test ratio (Quick assets ÷ Current liabilities). Liquidity ratios are presented in Study Unit 7, Subunit 2.

b. A firm that adopts an **aggressive** working capital policy seeks to increase profitability while accepting reduced liquidity and a higher risk of short-term cash flow problems.

   1) This policy is reflected in a lower current ratio and acid-test ratio.

c. Carrying excessive current assets, such as inventories, increases costs.

   1) The carrying costs of inventory usually increase in proportion to the quantity of inventory. Thus, the firm with excess inventory incurs not only the opportunity costs of funds invested in inventory but also the costs of storage and insurance.

   2) Also, spoilage and obsolescence costs increase as inventories increase.

d. The optimal level of current assets varies with the industry in which a firm operates.

   1) For example, a grocery store has spoilable inventory and cannot carry more than a few days of sales. In contrast, a uranium mine must have a high level of cash to meet ongoing expenses because its sales may be irregular.

5.2 CASH MANAGEMENT

CMA candidates must demonstrate an understanding of effective cash management and its value. You should (1) understand how to analyze the cost or benefit of holding cash for the organization and (2) know the motives for holding cash and be able to weigh those against the opportunity cost. CMAs will also be expected to evaluate cash budgeting by forecasting cash collection and payments. You should be able to (1) evaluate whether an organization should change the way it collects payments and (2) provide an analysis of how this should be done and the associated costs.

1. Managing the Level of Cash

a. The following are the three motives for holding cash:

1) Transactional (as a medium of exchange)
2) Precautionary (to provide a reserve for contingencies)
3) Speculative (to take advantage of unexpected opportunities)

b. The firm's optimal level of cash should be determined by a cost-benefit analysis.

1) Because cash does not earn a return, only the amount needed to satisfy current obligations as they come due should be kept.

2) The motives for holding cash must be balanced against the opportunity cost of missed investments in marketable securities. The expected return on available investment projects must exceed the return on investments of comparable risk.

a) One approach is the economic order quantity (EOQ) model originally developed for inventory management.

EOQ Model Applied to Cash Management

$$Q = \sqrt{\frac{2bT}{i}}$$

If: Q = optimal cash balance
b = fixed cost per transaction
T = total demand for cash for the period
i = interest rate on marketable securities

EXAMPLE 5-1 Optimal Cash Balance

A firm projects that it needs $20,000 to pay its obligations during the upcoming month. Every marketable security transaction costs $5, and securities are currently paying 6% annual interest. The optimal cash balance can be determined by applying the EOQ model:

$$Q = \sqrt{\frac{2bT}{i}} = \sqrt{\frac{2 \times \$5 \times \$20{,}000}{6\% \div 12 \text{ months}}} = \sqrt{\frac{\$200{,}000}{.005}} = \$6{,}324$$

The firm's optimal cash balance for the upcoming month is $6,324, and its average balance will be $3,162 ($6,324 ÷ 2).

2. Forecasting Future Cash Flows

a. Managing cash flows begins with the cash budget. It states projected receipts and payments for the purpose of matching inflows and outflows.

1) The budget is for a specific period, but cash budgeting is an ongoing, cumulative activity. It is re-evaluated constantly to ensure all objectives are met.

b. Cash receipts are based on projected sales, credit terms, and estimated collection rates.

EXAMPLE 5-2 Cash Collections Forecast

A firm forecasts the following cash collections for the next 4 months:

	Cash Sales	Credit Sales
July	$40,000	$160,000
August	60,000	220,000
September	80,000	340,000
October	70,000	300,000

On average, 50% of credit sales are paid for in the month of sale, 30% in the month after sale, and 15% in the second month after sale (5% are expected to be uncollectible). The firm's projected cash collections for October can be calculated as follows:

October cash sales			$ 70,000
October credit sales:	$300,000 × 50%	=	150,000
September credit sales:	$340,000 × 30%	=	102,000
August credit sales:	$220,000 × 15%	=	33,000
Total October collections			$355,000

c. Cash payments are based on budgeted purchases and total sales.

EXAMPLE 5-3 Cash Payments Forecast

The firm forecasts the following cash payments for the next 4 months:

	Purchases	Total Sales
July	$200,000	$200,000
August	250,000	280,000
September	300,000	420,000
October	350,000	370,000

On average, the firm pays for 50% of purchases in the month of purchase and 25% in each of the 2 following months. Payroll is projected as 10% of that month's sales and operating expenses are 20% of the following month's sales (November's sales are projected to be $280,000). Interest of $5,000 is paid every month. The firm's projected cash payments for October can be calculated as follows:

October purchases:	$350,000 × 50%	=	$175,000
September purchases:	$300,000 × 25%	=	75,000
August purchases:	$250,000 × 25%	=	62,500
October payroll:	$370,000 × 10%	=	37,000
October op. expenses	$280,000 × 20%	=	56,000
Interest			5,000
Total October disbursements			$410,500

3. **Speeding Up Cash Collections**

   a. The period from when a payor mails a check until the funds are available in the payee's bank is float. Firms use various strategies to decrease the float time for receipts.

   b. The product of the daily amount of receipts and the number of days of reduced float is the increase in the average cash balance. This amount is multiplied by an annual rate of return on short-term investments, which is the opportunity cost of the funds, to arrive at the **annual benefit**.

      (Daily cash receipts × Days of reduced float) × Opportunity cost of funds

      1) EXAMPLE: A firm has $22,000 in daily cash receipts. It is considering a plan that costs $0 and speeds up collections by 2 days. The result is an additional $44,000 in the firm's average cash balance ($22,000 × 2 days). Marketable securities currently pay 6% annually.

         Benefit = $44,000 × 6% = $2,640 annually

   c. The benefit of any plan to speed up cash collections must exceed the cost.

      1) EXAMPLE: A firm has daily cash receipts of $150,000. A bank has offered to reduce the collection time by 2 days, increasing the firm's average cash balance by $300,000 ($150,000 × 2 days). The bank will charge a monthly fee of $1,250. Money market funds are expected to average 8% during the year.

         Benefit (loss) = Interest earned – Cost
         = ($300,000 × 8%) – ($1,250 × 12 months)
         = $24,000 – $15,000
         = $9,000 annually

   d. A **lockbox system** is a popular means of speeding up cash receipts.

      1) Customers submit their payments to a mailbox rather than to the firm's offices.

         a) Bank personnel remove the envelopes from the mailbox and deposit the checks to the firm's account immediately.

      2) The bank generally charges a flat monthly fee for this service.

      3) For firms doing business nationwide, a lockbox network is appropriate.

         a) The country is divided into regions according to customer population patterns.
         b) A lockbox arrangement is then established with a bank in each region.

      4) Refer to the example presented in item 3.c.1) above to calculate the net benefit of a lockbox system.

   e. **Concentration banking** is another means of speeding up cash receipts.

      1) Customers submit their payments to a local branch office. Subsequently, the branch office deposits the checks into a local bank account. The local bank then transfers the funds to a concentration account at one of the firm's principal banks.

   f. Transfer of funds by wire speeds up cash management. A wire transfer is any electronic funds transfer (EFT) by means of a two-way system.

4. **Slowing Cash Payments**

   a. Payment (disbursement) **float** is the period from when the payor writes a check until the funds clear and are deducted from the payor's account. Check float results in an interest-free loan to the payor because of the delay between payment by check and its deduction from the bank account. To increase payment float, a firm may send checks to its vendors without being certain that it has sufficient funds to cover them all.

      1) For these situations, some banks offer **overdraft protection**. The bank guarantees (for a fee) to cover any shortage with a transfer from the firm's master account.

   b. If the payor **writes and receives** checks and the time it takes for the checks to clear differs, the float is the amount of the written check that has not yet cleared when the received check has cleared.

   c. Other methods for managing cash outflows include

      1) Zero balance accounts (ZBAs). ZBAs are checking accounts in which a balance of $0 is maintained by automatically transferring funds from a master account in an amount only large enough to cover checks presented for payment.

      2) Centralizing accounts payable.

      3) Controlled disbursement accounts.

5. **Compensating Balance**

   a. A compensating balance is the minimum amount that a bank requires a firm to keep frozen in its account. Compensating balances are noninterest-bearing and are meant to compensate the bank for various services rendered, such as unlimited check writing. These balances incur opportunity costs because they are unavailable for investment purposes.

5.3 MARKETABLE SECURITIES MANAGEMENT

1. **Managing Marketable Securities**

   a. Idle cash incurs an opportunity cost, i.e., the return that could be earned if the cash was invested. To offset this cost, firms invest their idle cash balances in marketable securities.

      1) An entity also must consider whether the maturities of marketable securities match the needs for the cash.

   b. Beyond achieving an optimal risk and after-tax return trade-off, the most important aspects of marketable securities management are liquidity and safety.

      1) Liquidity is the ability to convert an investment into cash quickly and without a loss of principal.

      2) Marketable securities management thus concerns low-yield, low-risk instruments that are traded on highly active markets (money market instruments).

2. **Types of Marketable Securities**

   a. The money market is the market for short-term investments where firms invest their temporary surpluses of cash.

      1) The money market is not formally organized. It consists of many financial institutions, firms, and government agencies offering instruments of various risk levels and short- to medium-range maturities.

   b. U.S. Treasury obligations are (1) the safest investment, (2) exempt from state and local taxation (but subject to federal income tax), and (3) highly liquid.

      1) Treasury bills (T-bills) have maturities of 1 year or less. They have no coupon rate and are sold at a discount. For example, if a $1,000 Treasury bill with a 1-year maturity is discounted at 3%, the cost is $970. The investor receives $30 of interest ($1,000 × 3% × 1 year) when the bill matures at $1,000. For a 6-month Treasury bill, discounted at a 4% rate, the cost is $980. The $1,000 payment at maturity earns the investor $20 of interest ($1,000 × 4% × .5 year).

         a) T-bills are often held as a substitute for cash since they have no default risk.

      2) Treasury notes (T-notes) have maturities of 1 to 10 years. They provide the lender with an interest payment every 6 months.

      3) Treasury bonds (T-bonds) have maturities of 10 years or longer. They provide the lender with an interest payment every 6 months.

   c. Federal agency securities are backed by either (1) the full faith and credit of the U.S. government or (2) only by the issuing agency.

      1) State and local governments issue short-term securities exempt from taxation.

   d. Repurchase agreements (repos) are a means for dealers in government securities to finance their portfolios.

      1) When a firm buys a repo, it is temporarily purchasing some of the dealer's government securities. The dealer agrees to repurchase them at a later time for a specific (higher) price.

      2) In essence, the firm gives the securities dealer a secured, short-term loan.

      3) Maturities vary from overnight to a few days.

   e. Bankers' acceptances are drafts drawn by a nonfinancial firm on deposits at a bank.

      1) The drawer (firm) then sells the draft to an investor (holder).

      2) One advantage is that the acceptance by the bank is a guarantee of payment at maturity.

         a) The payee can rely on the creditworthiness of the bank rather than on that of the (presumably riskier) drawer.

      3) A second advantage is that, because they are backed by the prestige of a large bank, these instruments are highly marketable once they have been accepted.

   f. Commercial paper consists of unsecured, short-term notes issued by large companies that are very good credit risks.

g. Certificates of deposit (CDs) are a form of savings deposit that cannot be withdrawn before maturity without a high penalty.

1) CDs often yield a lower return than commercial paper and bankers' acceptances because they are less risky.

2) Negotiable CDs are CDs that can be sold in the secondary market.

h. Eurodollars are time deposits of U.S. dollars in banks located abroad.

i. Money market mutual funds invest in short-term, low-risk securities.

1) In addition to paying interest, these funds allow investors to write checks on their balances.

5.4 PORTFOLIO MANAGEMENT

1. Efficient Portfolios

a. An investor wants to maximize return and minimize risk when choosing a portfolio of investments. A feasible portfolio that offers the highest expected return for a given risk or the least risk for a given expected return is an efficient portfolio.

b. An **indifference curve** represents combinations of portfolios having equal utility to the investor. Given that risk and returns are plotted on the horizontal and vertical axes, respectively, and that the investor is risk averse, the curve has an increasingly positive slope. As risk increases, the additional required return per unit of additional risk also increases.

1) The steeper the slope of an indifference curve, the more risk averse an investor is.

2) The higher the curve, the greater is the investor's level of utility.

3) In the diagram below, A, B, C, D, and E are indifference curves. A represents the highest level of utility and E the lowest. On a given curve, each point represents the same total utility to a risk-averse investor. For example, points 1, 2, and 3 are different combinations of risk and return that yield the same utility. The investor is indifferent as to which combination is chosen.

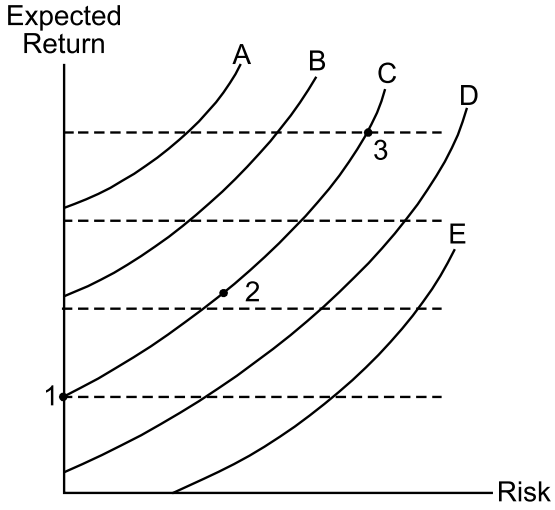


Figure 5-1

c. Two important decisions are involved in managing a company's portfolio:

1) The amount of money to invest
2) The securities in which to invest

d. The investment in securities should be based on expected net cash flows and cash flow uncertainty evaluations.

1) Arranging a portfolio so that the maturity of funds will coincide with the need for funds will maximize the average return on the portfolio and provide increased flexibility.

a) **Maturity matching** ensures that securities will not have to be sold unexpectedly.

2) If its cash flows are relatively uncertain, a security's marketability and market risk are important factors to be considered. Transaction costs are also a consideration.

a) Higher-yield long-term securities provide less certainty.

3) When cash flows are relatively certain, the maturity date becomes the most important concern.

2. **Hedging**

a. Hedging is the process of using offsetting commitments to minimize or avoid the impact of adverse price movements. Hedging transactions are often used to protect positions in (1) securities, (2) commodity buying, (3) foreign currency, and (4) interest rates.

1) Thus, the purchase or sale of a derivative or other instrument is a hedge if it is expected to reduce the risk of adverse price movements in an asset.

a) For example, if a flour company buys and uses 1 million bushels of wheat each month, it may wish to guard against increases in wheat costs when it has committed to sell at a price related to the current cost of wheat. The company will purchase wheat futures contracts that will result in gains if the price of wheat increases (offsetting the actual increased costs).

2) A natural hedge is a method of reducing financial risk by investing in two different items whose performance tends to cancel each other. However, natural hedges are not perfect in that they do not eliminate all risk.

a) Buying insurance is a natural hedge.

b) Pair trading, or buying long and short positions in highly correlated stocks, can be an effective method of hedging securities.

c) Investing in both stocks and bonds is sometimes viewed as a natural hedge, since the performance of one offsets the other.

3) Futures contracts are used to hedge commodities. They are agreements to buy or sell assets at a fixed price that are to be delivered and paid for later.

a) Long hedges are futures contracts that are purchased to protect against price increases.

b) Short hedges are futures contracts that are sold to protect against price declines.

c) Because commodities can be bought and sold **on margin**, considerable leverage is involved. Leverage is most beneficial to the speculator who is seeking large returns and is willing to bear proportionate risk.

3. **Measures of Risk**

   a. Risk is the chance that the actual return on an investment will differ from the expected return.

   b. The **expected rate of return ($\overline{R}$)** on an investment is determined using an expected value calculation. It is an average of the possible outcomes weighted according to their probabilities.

$$\textbf{Expected rate of return } (\overline{R}) = \sum \textbf{(Possible rate of return} \times \textbf{Probability)}$$

EXAMPLE 5-4 Expected Rate of Return

A company is considering investing in the common stock of one of two firms, Xatalan Corp. and Yarmouth Co. The expected rates of return on the two securities based on the weighted-averages of their probable outcomes are calculated as follows:

Xatalan Corporation Stock

Rate of Return %		Probability %		Weighted Average
80 %	×	60%	=	48 %
(50)%	×	40%	=	(20)%
Expected rate of return ($\overline{R}$)				**28 %**

Yarmouth Company Stock

Rate of Return %		Probability %		Weighted Average
30 %	×	70%	=	21 %
(10)%	×	30%	=	(3)%
Expected rate of return ($\overline{R}$)				**18 %**

The expected rate of return on Xatalan Corporation stock is higher, but the risk of each investment also should be measured.

   c. One way to measure risk is with the **standard deviation (variance)** of the distribution of an investment's return. The standard deviation measures the tightness of the distribution and the riskiness of the investment.

      1) A large standard deviation reflects a broadly dispersed probability distribution, meaning the range of possible returns is wide. Conversely, the smaller the standard deviation, the tighter the probability distribution and the lower the risk.

         a) Thus, the following general statement can be made: the greater the standard deviation, the riskier the investment.

4. **Security Risk vs. Portfolio Risk**

   a. These calculations apply to investments in individual securities. When a portfolio is held, however, additional considerations apply. Risk and return should be evaluated for the entire portfolio, not for individual assets.

   b. The expected return on a portfolio is the weighted average of the returns on the individual securities.

   c. However, the risk of the portfolio is usually not an average of the standard deviations of the particular securities. Thanks to the diversification effect, combining securities results in a portfolio risk that is less than the average of the standard deviations because the returns are imperfectly correlated.

5. **Correlation**

   a. The **correlation coefficient *(r)*** measures the degree to which any two variables, e.g., two stocks in a portfolio, are related. It has a range from 1.0 to –1.0.

      1) Perfect positive correlation (1.0) means the two variables always move together.

      2) Perfect negative correlation (–1.0) means the two variables always move in the opposite direction.

      3) Given perfect negative correlation, risk would, in theory, be eliminated.

         a) This method is used to hedge risk when investing in stocks.

      4) In practice, the existence of market risk makes perfect correlation nearly impossible.

         a) The normal range for the correlation of two randomly selected stocks is .50 to .70. The result is a reduction in, but not elimination of, risk.

6. **Covariance**

   a. The correlation coefficient of two securities can be combined with their standard deviations to arrive at their covariance, a measure of their mutual volatility.

Covariance of a Two-Stock Portfolio

$$\text{Correlation coefficient} \times \text{Standard deviation}_1 \times \text{Standard deviation}_2$$

EXAMPLE 5-5 Covariance

The coefficient of correlation of Xatalan Corporation stock and Yarmouth Company stock is 0.6, meaning they move in the same direction 60% of the time. Additionally, Xatalan Corporation's stock has a standard deviation of 63.37% and Yarmouth Company's stock has a standard deviation of 88.31%. The covariance of a portfolio consisting entirely of these two stocks is calculated as follows:

$$\begin{aligned}\text{Covariance of two-stock portfolio} &= 0.6 \times .6337 \times .8831 \\ &= .3358\end{aligned}$$

7. **Risk and Diversification**

   a. **Specific risk**, also called diversifiable risk, unsystematic risk, residual risk, or unique risk, is the risk associated with a specific investee's operations: new products, patents, acquisitions, competitors' activities, etc.

      1) Specific risk is the risk that can be potentially eliminated by diversification.

         a) **Diversification** is a hedging technique that makes a wide variety of investments within a portfolio so that the positive performance of some investments cancels out the negative performance of other investments.

      2) In principle, diversifiable risk should continue to decrease as the number of different securities held increases.

         a) In practice, however, the benefits of diversification become extremely small when more than about 20 to 30 different securities are held. Moreover, commissions and other transaction costs increase with greater diversification.

         b) Thus, the benefits of diversification can decline to near zero when the number of securities held increases beyond 40.

   b. **Market risk**, also called undiversifiable risk or systematic risk, is the risk of the stock market as a whole. Some conditions in the national economy affect all businesses, which is why equity prices so often move together.

8. **Beta**
   a. The effect of an individual security on the volatility of a portfolio is measured by its sensitivity to movements by the overall market. This sensitivity is stated in terms of a stock's **beta coefficient (β)**.
      1) Beta is the best measure of the risk of an individual security held in a diversified portfolio because it determines how the security affects the risk of the portfolio.
      2) An average-risk stock has a beta of 1.0 because its returns are perfectly positively correlated with those on the market portfolio. For example, if the market return increases by 20%, the return on the security increases by 20%.
      3) A beta of less than 1.0 means that the security is less volatile than the market; e.g., if the market return increases by 20% and the security's return increases only 10%, the security has a beta of .5.
      4) A beta of more than 1.0 indicates a volatile security; e.g., if the return increases 30% when the market return increases by 15%, the security has a beta of 2.0.
   b. The beta coefficient is the slope of the regression line for the returns of an individual security (the dependent variable) and the overall market return (the independent variable).
      1) The beta for a security may also be calculated by dividing the covariance of the return on the market and the return on the security by the variance of the return on the market.
   c. The beta of a portfolio is the weighted average of the betas of the individual securities.
   d. A particular stock's beta value is influenced by (1) its debt-to-equity ratio (financial leverage), (2) its operating leverage (ratio of fixed costs to variable costs), and (3) the characteristics of the industry in which it operates.

9. **Capital Asset Pricing Model (CAPM)**
   a. Investors want to reduce their risk, and therefore take advantage of diversification, by holding a portfolio of securities. In order to measure how a particular security contributes to the risk and return of a diversified portfolio, investors can use the capital asset pricing model (CAPM).
   b. The CAPM quantifies the required return on an equity security by relating the security's level of risk to the average return available in the market (portfolio).
   c. The CAPM formula is based on the idea that the investor must be compensated for his or her investment in two ways: time value of money and risk.
      1) The time value component is the risk-free rate (denoted R_F in the formula). It is the return provided by the safest investments, e.g., U.S. Treasury securities.

2) The risk component consists of

   a) The market risk premium (denoted $R_M - R_F$), which is the return provided by the market over and above the risk-free rate, weighted by

   b) A measure of the security's risk, called beta (β).

CAPM Formula

Required rate of return = $R_F + \beta(R_M - R_F)$

If: R_F = Risk-free return
R_M = Market return
β = Measure of the systematic risk or volatility of the individual security in comparison to the market (diversified portfolio)

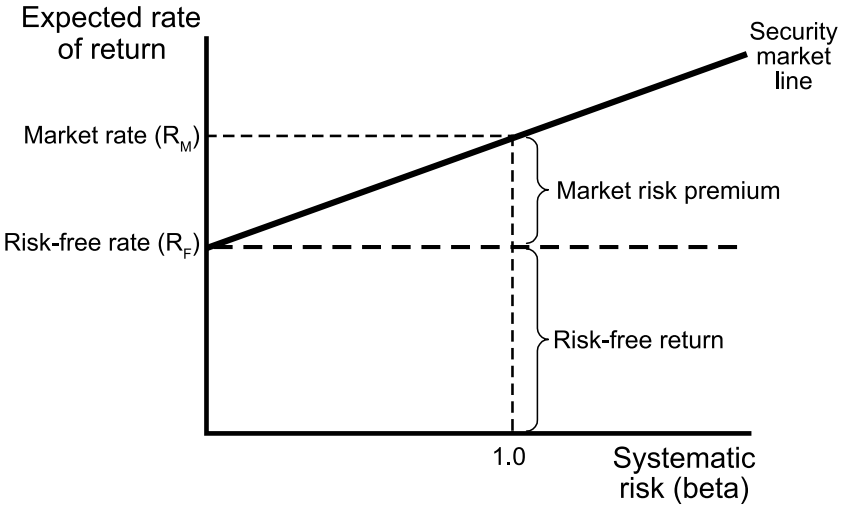


Figure 5-2

EXAMPLE 5-6 Required Rate of Return

An investor is considering the purchase of a stock with a beta value of 1.2. Treasury bills are currently paying 8.6%, and the expected average return on the market is 10.1%. (Remember, U.S. Treasuries are considered as close to a risk-free investment as there can be.) To be induced to buy this stock, the return that the investor must receive is calculated as follows:

Required rate of return = $R_F + \beta(R_M - R_F)$
= 8.6% + 1.2(10.1% – 8.6%)
= 8.6% + 1.8%
= 10.4%

d. There are two practical problems with the use of CAPM:

   1) It is hard to estimate the risk-free rate of return on projects under different economic environments.

   2) The CAPM is a single-period model. It should not be used for projects lasting more than 1 year.

10. **Quantitative Risk Assessment Tools**

    a. **Value at risk (VaR)** is a technique that employs a normal distribution (bell curve) to determine the maximum potential gain or loss within a certain period at a given level of confidence.

        1) The highest point in the curve represents the most probable event with all other possible situations equally distributed around the most probable event.

        2) Within 1.96 standard deviations from the most probable event, the potential gain or loss can be calculated with 95% confidence.

        3) Within 2.57 standard deviations from the most probable event, the potential gain or loss can be calculated with 99% confidence.

        4) For example, management can state with 95% confidence that the potential loss associated with a given risk is $3.7 billion.

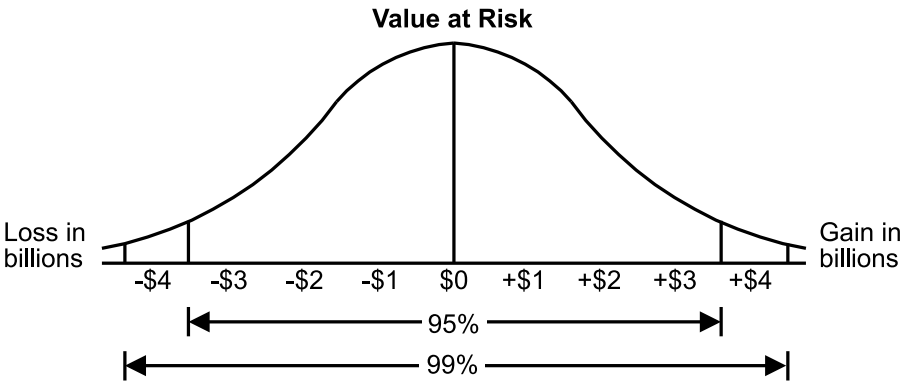


Figure 5-3

    b. Cash flow at risk and earnings at risk are identical in application to VaR.

5.5 RECEIVABLES MANAGEMENT

1. **Overview**

   a. Receivables management is also referred to as trade credit policy.

   b. Accounts receivable are carried for competitive and investment purposes.

      1) A firm almost always must offer credit if its competitors do.

      2) Customers who choose to pay beyond the stated time limit can be charged financing fees (interest income to the firm).

      3) Due to the interaction of these two factors, managing accounts receivable must involve the sales, finance, and accounting functions.

   c. Administrative factors influencing the level of receivables include the soundness of the

      1) Procedures for evaluating customer creditworthiness,
      2) Formula for establishing standard credit terms,
      3) System for tracking accounts receivable and billing customers, and
      4) Procedures for following up on overdue accounts.

   d. Market factors influencing the level of receivables include the cost of borrowing and the opportunity for repeat sales.

      1) Low gross margin per unit and operating at full capacity are reasons not to ease credit terms.

   e. The optimal credit policy does not seek merely to maximize sales.

      1) This result could be accomplished by increasing discounts, offering longer payment periods, or accepting riskier customers.

         a) But the firm cannot ignore the increase in bad debts and its negative effect on cash inflows.

         b) Thus, the firm must balance default risk (bad debt experience) and sales maximization.

   f. **Default risk** is the probability that a particular customer will be unwilling or unable to pay a debt.

      1) To manage (not necessarily minimize) default risk, firms often require written agreements to be signed by the customer, outlining the terms of credit and the consequences for nonpayment.

      2) Firms often use credit scoring to determine whether to extend credit to a specific customer. Credit scoring assigns numerical values to the elements of credit worthiness.

   g. The **cash conversion cycle** is the time that passes, on average, between the firm's payment for a purchase of inventory and the collection of cash from a customer on the sale of that inventory.

      1) The operating cycle is the cash cycle plus the time between purchases and payment (the operating cycle is covered in Study Unit 8, Subunit 1).

2. Aging Accounts Receivable

a. A common analytical tool is an aging schedule of accounts receivable. It stratifies the accounts depending on time outstanding.

b. Since accounts that have been outstanding longest are also the least likely to be collected, an aging of accounts receivable provides useful information on collectability.

EXAMPLE 5-7 Aging Accounts Receivable

Midburg prepares the following aging schedule of its accounts receivable:

Balance Range	Less than 30 Days	31-60 Days	61-90 Days	Over 90 Days	Total Balances
$0 - $100	$ 5,000	$ 200	$ 100	$ 100	$ 5,400
$100 - $1,000	8,000	3,800			11,800
$1,000 - $5,000	20,000	2,000	1,900		23,900
$5,000 - $10,000	38,000		8,000	900	46,900
Over $10,000		12,000			12,000
Totals	$71,000	$18,000	$10,000	$1,000	$100,000

Midburg then applies an appropriate percentage to each stratum based on experience.

Aging Intervals	Balance	Estimated Uncollectible	Ending Allowance
Less than 30 days	$ 71,000	2%	$1,420
30-60 days	18,000	12%	2,160
61-90 days	10,000	15%	1,500
Over 90 days	1,000	20%	200
Total	$100,000		$5,280

3. Basic Receivables Terms

a. The most common credit terms offered are 2/10, net 30. This convention means that the customer may either deduct 2% of the invoice amount if the invoice is paid within 10 days, or must pay the entire balance by the 30th day.

1) Credit terms do not include quantity discounts, which affect the prices of purchases, not financing.

b. The **average collection period** (also called the days sales outstanding in receivables) is the average number of days that pass between the time of a sale and payment of the invoice.

c. **Average accounts receivable** equals beginning accounts receivable plus ending accounts receivable, divided by 2. Alternative methods of calculating average accounts receivable include the following:

1) **Daily credit sales × Average collection period**
2) **Net credit sales × (Average collection period ÷ Days in year)**
3) **Net credit sales ÷ Accounts receivable turnover**

d. Accounts receivable activity measures (accounts receivable turnover and days' sales outstanding in receivables) are covered in detail in Study Unit 8, Subunit 1.

4. **Assessing the Impact of a Change in Credit Terms**

   a. Amounts of receivables are an opportunity cost, i.e., the return that could be earned if those amounts were invested elsewhere. A key aspect of any change in credit terms is balancing the competitive need to offer credit with the opportunity cost incurred.

   b. The increased investment in receivables is calculated with this formula:

$$\text{Incremental variable costs} \times \frac{\text{Incremental average collection period}}{\text{Days in year}}$$

      1) EXAMPLE: The firm is evaluating a proposal to relax its credit standards. Under the new plan, credit sales are expected to increase by $600,000. The new customers attracted by this plan are expected to have a 40-day average collection period. There are 360 days in the year. Variable costs are 80% of sales.

Increase in sales	$600,000
Times: Variable cost ratio	× 80%
Increase in variable costs	$480,000

Increased investment in receivables = $480,000 × (40 days ÷ 360 days)
= $53,333

   c. The cost of a change in credit terms is calculated with this formula:

Increased investment in receivables × Opportunity cost of funds

      1) Opportunity cost is the maximum benefit forgone by choosing an investment.
      2) EXAMPLE: Money market instruments are currently paying 12%.

Increased investment in receivables	$53,333
Times: Opportunity cost of funds	× 12%
Cost of new credit plan	$ 6,400

   d. The **benefit or loss** resulting from a change in credit terms is calculated with this formula:

Incremental contribution margin – Cost of change

      1) EXAMPLE: The firm can now calculate the net benefit from the proposed change in credit policy:

Increase in sales	$600,000
Times: Contribution margin ratio	× 20%
Increase in contribution margin	$120,000
Minus: Cost of new credit plan	(6,400)
Benefit of new credit plan	$113,600

   e. The upper limit of a company's credit period is the operating cycle of the purchaser. If the credit period is longer than the purchaser's operating cycle, the seller is, in effect, financing more than just the purchaser's inventory needs.

5. **Factoring**

   a. Factoring is a transfer of receivables to a third party (a factor) who assumes the responsibility of collection.

   b. A factor usually receives a high financing fee plus a fee for collection. Furthermore, the factor often operates more efficiently than its clients because of the specialized nature of its services.

EXAMPLE 5-8 Factoring Receivables

A factor charges a 2% fee plus an interest rate of 18% on all cash advanced to a transferor of accounts receivable. Monthly sales are $100,000, and the factor advances 90% of the receivables submitted after deducting the 2% fee and the interest. Credit terms are net 60 days. What is the cost to the transferor 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 transferor	$ 88,000	
Minus: 18% interest for 60 days	(2,640)	[$88,000 × 18% × (60 ÷ 360)]
Amount to be received immediately	$ 85,360	

The transferor also will 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 transferor to factor the receivables for the month is $4,640 ($2,000 factor fee + interest of $2,640). Assuming that the factor has approved the customers' credit in advance (the sale is without recourse), the transferor will not absorb any bad debts.

   c. **Credit card sales** are a common form of factoring. The retailer benefits by prompt receipt of cash and avoidance of bad debts and other costs. In return, the credit card company charges a fee.

6. **Pledging**

   a. A pledge (a general assignment) is the use of receivables as collateral (security) for a loan. The borrower agrees to use collections of receivables to repay the loan.

      1) Upon default, the lender can sell the receivables to recover the loan proceeds.

      2) Because a pledge is a relatively informal arrangement, it is not reflected in the accounts.

5.6 INVENTORY MANAGEMENT

1. **Overview**

   a. Inventory is primarily held for sale to customers. Additional reasons for carrying inventory include

      1) Protecting against supply uncertainty (vendors may have financial difficulties or shipments may be delayed)

      2) Protecting against fluctuations in demand (in order to capitalize on unexpected spikes in demand, extra inventory must be carried)

         a) These considerations are balances to ensure that operations are not interrupted by inventory shortages.

b. **Costs related to inventory.** Minimizing total inventory cost involves constant evaluation of the tradeoffs among the four components:

1) **Purchase costs** are the actual invoice amounts charged by suppliers and include shipping costs. This is also referred to as investment in inventory.

2) **Carrying costs** are associated with holding inventory: (a) storage, (b) insurance, (c) security, (d) inventory taxes, (e) depreciation or rent of facilities, (f) interest, (g) obsolescence and spoilage, and (h) the opportunity cost of funds invested in inventory (i.e., inventoriable costs).

   a) Carrying costs are calculated using average inventory [(Beginning inventory + Ending inventory) ÷ 2].

3) **Ordering costs** are the costs of placing an order with a vendor. They are independent of the number of units ordered. For internally manufactured units, they are the costs of setting up a production line.

4) **Stockout costs** are the opportunity cost of missing a customer order. These can also include the costs of expediting a special shipment necessitated by insufficient inventory on hand.

5) EXAMPLE: The following cost data are available for an item of inventory:

Invoice price	$300.00	per unit
Shipping costs	$15.00	per unit
Inventory insurance	$5.00	per unit
Handling	$80.00	per order
Order cost	$15.00	per order
Cost of capital	20%	

The per-unit purchase cost and the cost of carrying a unit of inventory can be calculated as follows:

Invoice price	$300
Shipping costs	15
Per-unit purchase cost	$315
Times: Cost of capital	× 20%
Opportunity cost	$ 63
Insurance on inventory	5
Per-unit carrying cost	$ 68

c. The optimal level of inventory is the one that (1) considers the reasons for carrying inventory and (2) minimizes total inventory cost.

d. To protect against the risk of stockouts, a level of extra stock, **safety stock**, is held.

1) Maintaining safety stock increases carrying costs.

2) Determining the appropriate level of safety stock involves balancing the variability of customer demand, variability in lead time, and level of risk of stockout the firm is willing to accept. A high variability in daily sales necessitates a higher safety stock level.

3) The **cost of safety stock** is the carrying cost of the safety stock plus the expected stockout cost.

e. The challenge inherent in minimizing total inventory cost is illustrated in the following diagram:

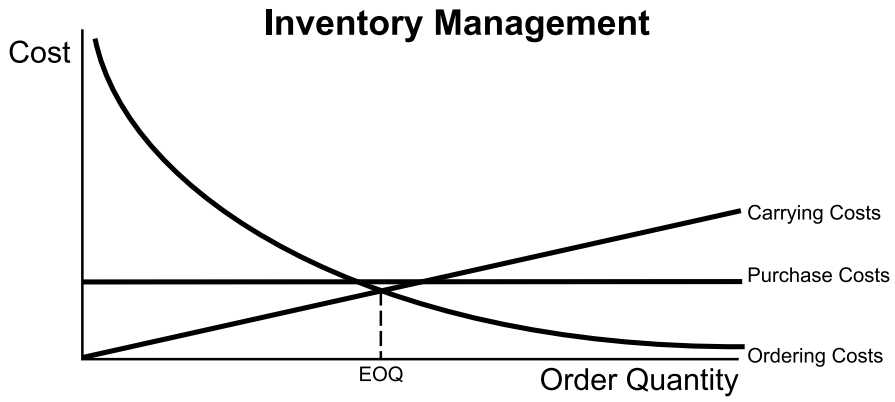


Figure 5-4

f. The following relationships exist:

1) Stockout costs can be minimized only by incurring high carrying costs.
2) Carrying costs can be minimized only by incurring the high fixed costs of placing many small orders.
3) Ordering costs can be minimized but only at the cost of storing large quantities.

2. **Just-in-Time and Kanban Inventory Systems**

a. In a just-in-time (JIT) inventory system, the storage of inventory is treated as a nonvalue-adding activity. JIT minimizes inventory investment by having materials arrive at the time they are needed.

1) All materials inventories (and their associated carrying costs) are reduced or eliminated entirely. Binding agreements with suppliers ensure that materials arrive exactly when they are needed and not before.
2) JIT is a pull or demand-driven system. Production of goods does not begin until an order has been received. In this way, finished goods inventories also are eliminated.

b. Another method of improving inventory flow is the kanban system, developed by the Toyota Motor Corporation (kanban is not characteristic of Japanese industry as a whole).

1) 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.
2) A basic kanban system includes a withdrawal kanban that states the quantity that a later process should withdraw from its predecessor, a production kanban that states the output of the preceding process, and a vendor kanban that tells a vendor what, how much, where, and when to deliver.

3. **Inventory Replenishment Models**

   a. **Lead time** is the time between placing an order with a supplier and receipt of the goods.

      1) When lead time is known and demand is uniform, goods can be timed to arrive just as inventory on hand is exhausted.

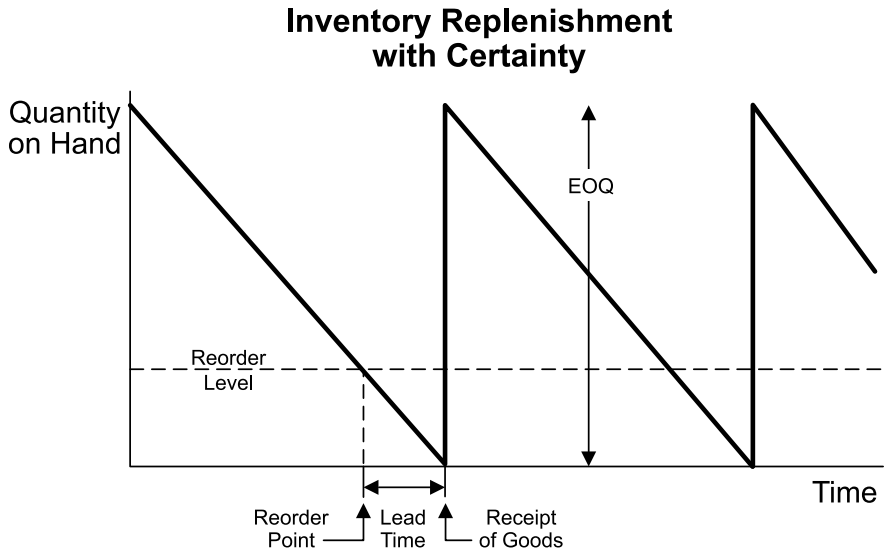


Figure 5-5

   b. The **reorder point** can be calculated as follows:

(Average demand × Lead time) + Safety stock

   c. The certainty depicted in the graph above is rare outside of just-in-time systems. Accordingly, safety stock is held as a hedge against contingencies.

      1) Determining the appropriate level of safety stock involves a probabilistic calculation.
      2) It balances the variability of demand with the acceptable risk of stockout costs.

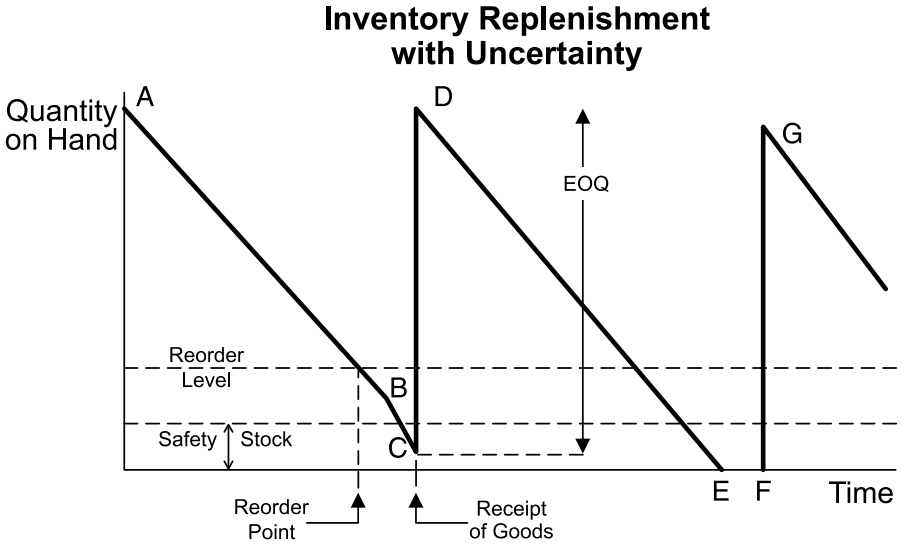


Figure 5-6

   d. The diagram above assumes uncertainty. At point B, during the lead time of an order, demand increased, and the safety stock was used. Receipt of the order restored quantities to point D. During EF, a stockout occurred because of a delay in receipt of the order. Receipt of the order restored quantities to point G.

e. The total **cost of carrying safety stock** consists of two components:

Cost of carrying safety stock = Expected stockout cost + Carrying cost

EXAMPLE 5-9 Cost of Safety Stock

A firm has prepared the following schedule of the likelihood of stockouts at various levels of safety stock for the upcoming year:

Safety Stock Level		Resulting Stockout		Probability		Expected Stockout
200		0	×	10%	=	0
100		100	×	20%	=	20
0		100	×	15%	=	15

Expected stockout costs for the year are calculated as follows:

Safety Stock Level		Expected Stockout		Unit Cost of Stockout		Orders per Year		Expected Stockout Costs
200		0	×	$3.50	×	18	=	$0
100		20	×	$3.50	×	18	=	$1,260
0		15	×	$3.50	×	18	=	$945

Carrying costs for the various levels of safety stock are calculated as follows:

Safety Stock Level		Unit Carrying Costs		Total Carrying Costs
200	×	$4.00	=	$800
100	×	$4.00	=	$400
0	×	$4.00	=	$0

The annual cost of safety stock for each level can now be calculated. In this case, the cost of safety stock is minimized by holding 200 units.

Safety Stock Level	Expected Stockout Costs		Total Carrying Costs		Total Costs of Safety Stock
200	$0	+	$800	=	$800
100	$1,260	+	$400	=	$1,660
0	$945	+	$0	=	$945

4. **Determining the Order Quantity**

   a. Refer to Figure 5-6 on page 21. Peak inventory is at different levels at points D and G.

      1) By contrast, the order quantities (lines CD and FG) are the same length. This indicates that effective inventory management is concerned not with the peak level of inventory but with the size of each order.

   b. The **economic order quantity (EOQ)** model is a mathematical means of determining the order quantity. It minimizes the sum of ordering costs and carrying costs.

$$\text{Economic order quantity (EOQ)} = \sqrt{\frac{2aD}{k}}$$

   If: a = fixed cost per purchase order (i.e., ordering costs)
   D = periodic demand in units
   k = carrying costs per unit

   NOTE: This concept is depicted in Figure 5-4 on page 20.

   c. The following are the **assumptions of the EOQ model**:

      1) Demand is uniform.
      2) Carrying costs are constant.
      3) The same quantity is ordered at each reorder point.
      4) Purchasing costs are unaffected by the quantity ordered.
      5) Sales are perfectly predictable.
      6) Lead time is known with certainty.
      7) Deliveries are consistent.
      8) Adequate inventory is maintained to avoid stockouts.

   d. A change in any of the variables changes the EOQ solution. If demand or order costs rise, each order must contain more units. If carrying costs rise, each order must contain fewer units.

STUDY UNIT SIX

CORPORATE RESTRUCTURING AND INTERNATIONAL FINANCE

This study unit is the **fourth of four** on **corporate finance**. The relative weight assigned to this major topic in Part 2 of the exam is **20%**. The four study units are

Study Unit 3: Financial Markets and Types of Securities
Study Unit 4: Valuation Methods and Cost of Capital
Study Unit 5: Managing Current Assets
Study Unit 6: Corporate Restructuring and International Finance

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

6.1 MERGERS AND ACQUISITIONS (M&As)

1. **Mergers**
   a. A merger is a business transaction in which an acquiring firm absorbs a second firm, and the acquiring firm remains in business as a combination of the two merged firms. Generally, approval of the shareholders of each firm is required.
      1) A **consolidation** is similar to a merger, but a new entity is formed and neither of the merging entities survives.
   b. Three common types of mergers are as follows:
      1) A **horizontal merger** occurs when two firms in the same line of business combine.
      2) A **vertical merger** (vertical integration) combines a firm with one of its suppliers or customers.
      3) A **conglomerate merger** involves two unrelated firms in different industries.
   c. A merger is usually a negotiated arrangement between a single bidder and the acquired firm.
      1) Payment is most frequently in stock.
      2) The bidder is often a cash-rich firm in a mature industry and is seeking growth possibilities.
      3) The acquired firm is usually growing and in need of cash.

2. Acquisitions

NOTE: For the purpose of the CMA exam, acquisitions are valued using the **discounted cash flow method** (this method is presented in detail in Study Unit 9, Subunit 3).

a. An acquisition is the purchase of all of another firm's assets or a controlling interest in its stock.

   1) **Control** (controlling financial interest) is the direct or indirect ability to determine the direction of management and policies of the investee. An entity is presumed to have control when it acquires **more than 50%** of the voting interests (shares of common stock) of a second entity.

b. An acquisition of all of a firm's **assets** requires a vote of that firm's shareholders. It also entails the costly transfer of legal title, but it avoids the minority interest that may arise if the acquisition is by purchase of stock.

c. An acquisition by **stock** purchase is advantageous because it can be effected when management and the board of directors are hostile to the combination, and it does not require a formal vote of the firm's shareholders.

   1) If the acquiring firm's offer is rejected by the acquiree's management, a tender offer may be made directly to the acquiree's shareholders to obtain a controlling interest.

   2) A **tender offer** is a general invitation by an individual or a corporation to all shareholders of another corporation to tender their shares for a specified price.

d. Takeovers effected through tender offers may be friendly or hostile.

   1) When the takeover is friendly, the target is usually a successful firm in a growth industry, payment may be in cash or stock, and management of the target often has a high percentage of ownership.

   2) When the takeover is hostile, the target is usually in a mature industry and is underperforming, more than one bidder may emerge, management ownership is likely to be low, payment is more likely to be in cash, and the initial bidder is probably a corporate raider.

3. Motivation for M&As

a. Different stakeholders within an entity will have different reasons for seeking or avoiding M&As. The synergies in an optimal merger or acquisition benefit the shareholders of both firms.

   1) Managerial motivation is an issue because not all business decisions are based purely on economic considerations. Thus, the increased salary, fringe benefits, power, and prestige that often result from managing a larger enterprise may affect a manager's decision to consummate an M&A that is not favorable to the shareholders.

   2) Fear of negative personal consequences, i.e., being fired or replaced, may also cause a manager to resist a favorable combination, perhaps by entering into another combination that preserves the manager's position.

b. There are also benefits to the entity as a whole.

1) Diversification stabilizes earnings and reduces the risks to employees and creditors.
2) A combination may provide not only specific new investment opportunities but also a strategic position that will allow the combined entity to exploit conditions that may arise in the future. For example, the acquisition of a firm in a different industry may lead to the development of a broad product line if circumstances are favorable.
3) Greater market power because of reduced competition. However, antitrust restrictions, the globalization of markets, and the emergence of new forms of competition work against concentration of market power.
4) A firm may be a target if its breakup value exceeds the cost of its acquisition. Thus, the acquirer may earn a profit by selling the assets piecemeal.
5) **Synergy** exists if the value of the combined firm exceeds the sum of the values of the separate firms.
    a) Operational synergy arises because the combined firm may be able to operate more efficiently and reduce costs. The new firm may also gain a new product line and a stronger distribution system, potentially increasing revenues.
        i) Following a merger, if the average cost of production falls as a result of production level increases, then there are economies of scale.
    b) Financial synergy may reduce the cost of capital for both firms because the cost of issuing both debt and equity securities is lower for larger firms. Another benefit is the availability of additional internal capital.
    c) The synergy of a business combination can be determined by using the risk adjusted discount rate to discount the incremental cash flows of the newly formed entity.
6) Inefficient management may be replaced in a merger or acquisition by the management of the acquiring or merging firm, or the competency of existing management may be improved.
7) Another advantage is that the combined firm's optimal capital structure may allow for increased use of debt financing, with attendant tax savings from greater interest deductions.

4. Defenses against Takeovers

a. Greenmail

1) A targeted repurchase (greenmail) is a defensive tactic used to protect against takeover after a bidder buys a large number of shares on the open market and then makes (or threatens to make) a tender offer.

   a) If management and the board are opposed to the takeover (a hostile tender offer), the potential acquirer is offered the opportunity to sell his or her already acquired shares back to the corporation at an amount substantially above market value (i.e., paying greenmail).

2) In conjunction with greenmail, management may reach a standstill agreement in which the bidder agrees not to acquire additional shares.

b. Staggered Election of Directors

1) Staggered terms for directors require new shareholders to wait several years before being able to place their own people on the board.

2) Another antitakeover amendment to the corporate charter may require a supermajority (e.g., 80%) for approval of a combination.

c. Golden Parachutes

1) So-called golden parachutes are provisions passed by a board of directors requiring large payments to specified executives if the executives are fired.

2) Shareholders have often been unhappy with golden parachute payoffs and have filed suit to stop such payments.

d. Fair Price Provisions

1) Warrants are issued to shareholders that permit purchase of stock at a small percentage (often half) of market price in the event of a takeover attempt.

   a) The plan is intended to protect shareholder interests if the corporation is confronted by a coercive or unfair takeover attempt.

2) The objective is not to deter takeovers but to ensure that all shareholders are treated equally.

   a) In the event of a friendly tender offer, the outstanding stock rights (warrants) may be repurchased by the corporation for a few cents per share, thus paving the way for the takeover.

e. Voting-Rights Plans

1) Voting-rights plans contain provisions that prevent shareholders who hold a certain ownership percentage from voting on takeover issues.

f. **Leveraged Recapitalization**

1) Leveraged recapitalization, or restructuring, occurs when a company obtains a substantial amount of new debt and uses the funds to pay a cash dividend.

a) This results in a significant decrease in equity relative to debt, even to the point where net assets could be a negative amount. Such a debt load would discourage a potential acquirer.

g. **LBOs and Going Private**

1) A leveraged buyout (LBO) is a financing technique by which a company is purchased using very little equity. The cash-offer price is financed with large amounts of debt. An LBO is often used when a company is sold to management or some other group of employees, but it is also used in hostile takeovers.

a) The company's assets serve as collateral for a loan to finance the purchase.

b) In addition to greater financial leverage, the firm may benefit from an LBO because of savings in administrative costs from no longer being publicly traded. Furthermore, if the managers become owners, they have greater incentives and greater operational flexibility.

c) The high degree of risk in LBOs results from the fixed charges for interest on the loan and the lack of cash for expansion.

2) Going private entails the purchase of the publicly owned stock of a corporation by a small group of private investors, usually including senior managers. Accordingly, the stock is delisted (if it is traded on an exchange) because it will no longer be traded. Such a transaction is usually structured as a leveraged buyout.

h. **Poison Pill**

1) A target corporation's charter, bylaws, or contracts may include a wide variety of provisions that reduce the value of the target to potential tender offerors. For example, a valuable contract may terminate by its terms upon a specified form of change of ownership of the target. Two types of poison pills are flip-over rights and flip-in rights.

a) **Flip-over rights.** The charter of a target corporation may provide for its shareholders to acquire in exchange for their stock (in the target) a relatively greater interest (e.g., twice the shares of stock of equivalent value) in an acquiring entity.

b) **Flip-in rights.** Acquisition of more than a specified ownership interest (e.g., 25%) in the target corporation permits shareholders, except for the acquirer, to purchase additional shares at a reduced price.

i. **Issuing Stock**

1) The target corporation significantly increases the amount of outstanding stock.

j. **Reverse Tender**

1) The target corporation may respond with a tender offer to acquire control of the tender offeror.

k. **ESOP**

1) The trustees of an employee stock ownership plan are usually favorable to current management. Thus, they are likely to vote the shares allocated to the ESOP against a raider, who will probably destabilize the target corporation's current structure.

l. **White Knight Merger**

1) Target management arranges an alternative tender offer with a different acquirer that will be more favorable to incumbent management and shareholders.

m. **Crown Jewel Transfer**

1) The target corporation sells or otherwise disposes of one or more assets that made it a desirable target.

n. **Legal Action**

1) A target corporation may challenge one or more aspects of a tender offer. A resulting delay increases costs to the raider and enables further defensive action.

5. **Divestiture Options**

a. A divestiture involves the sale of an operating unit of a firm to a third party.

b. A **spin-off** is the creation of a new separate entity from another entity, with the new entity's shares distributed on a pro rata basis to existing shareholders of the parent entity.

1) Existing shareholders will have the same proportion of ownership in the new entity that they had in the parent.

2) A spin-off is a type of dividend to existing shareholders.

c. Reasons for spin-offs and divestitures include governmental antitrust litigation, refocusing of a firm's operations, and raising capital for the core business operation.

d. An **equity carve-out** involves the sale of a portion of the firm through a public offering.

1) It provides a way to quickly raise capital and bring in new management while still maintaining control.

e. A **split-up** is when an entity splits into two or more entities. Shares in the original entity are exchanged for shares in the new entities.

f. **Tracking stock** is stock issued in a division or segment of a parent entity. This provides investors with the opportunity to invest in only a portion of the entity. However, they have no claims on the assets of the division or segment. Rather, the parent entity maintains control over the division or segment.

g. Tax benefits may arise from a combination.

6. A **proxy fight** is an attempt by dissident shareholders to control, or at least influence, the corporation by electing directors. A proxy is a power of attorney authorizing a specified person to vote corporate stock.

6.2 EXCHANGE RATES -- SYSTEMS AND CALCULATIONS

Questions pertaining to currency exchange rates on the CMA exam will require the candidate to calculate forward and spot rates. In addition, a candidate should be able to understand how to determine if a currency has appreciated or depreciated and how that will influence purchasing power.

1. The Market for Foreign Currency

a. For international exchanges to occur, the two currencies involved must be easily convertible at some prevailing exchange rate. The exchange rate is the price of one country's currency in terms of another country's currency.

b. Four systems for setting exchange rates are in use. Each is described in items 2. through 5. below and on the next page.

1) Fixed rates
2) Freely floating rates
3) Managed floating rates
4) Pegged rates

BACKGROUND 6-1 Currency Exchange Rates

The gold standard prevailed from 1876 to 1913, i.e., countries pegged one unit of their currencies to a specified amount of gold. The gold standard was suspended during World War I. Following the war and during the Great Depression, the gold standard's reimplementation did not achieve universal success.

In 1944, during World War II, the United States convened a meeting of delegates from all 45 allied nations in Bretton Woods, New Hampshire. The convention's purpose was to establish a monetary system for the postwar world that would encourage rebuilding and prosperity while avoiding a disastrous repeat of the Great Depression. Under the resulting Bretton Woods Agreement, the U.S. guaranteed convertibility of the dollar into a certain quantity of gold, and all other nations in turn pegged their currencies to the dollar. To ensure stability, governments agreed that they would prevent exchange rates from fluctuating more than 1% plus or minus from their original rates.

This system could not be sustained after about 25 years. It was generally agreed that the U.S. currency was pegged too high, and in August 1971, President Richard Nixon ended direct convertibility of paper dollars into gold. By 1973, it was clear that any governmental intervention in currency markets was unworkable and a floating exchange rate system was established.

2. Fixed Exchange Rate System

a. In a fixed exchange rate system, the value of a country's currency in relation to another country's currency is either fixed or allowed to fluctuate only within a very narrow range.

b. The one very significant advantage to a fixed exchange rate is that it makes for a high degree of predictability in international trade because the element of uncertainty about gains and losses on exchange rate fluctuations is eliminated.

c. A disadvantage is that a government can manipulate the value of its currency.

3. Freely Floating Exchange Rate System

a. In a freely floating exchange rate system, the government steps aside and allows exchange rates to be determined entirely by the market forces of supply and demand.

b. The disadvantage is that a freely floating system makes a country vulnerable to economic conditions in other countries.

4. **Managed Float Exchange Rate System**

   a. In a managed float exchange rate system, the government allows market forces to determine exchange rates until they move too far in one direction or another. The government will then intervene to maintain the currency within the broad range considered appropriate.

      1) This system is the one currently in use by the major trading nations.

   b. The advantage of managed float is that it has the market-response nature of a freely floating system while still allowing for government intervention when necessary.

   c. The criticism of managed float is that it makes exporting countries vulnerable to sudden changes in exchange rates and lacks the self-correcting mechanism of a freely floating system.

5. **Pegged Exchange Rate System**

   a. In a pegged exchange rate system, a government fixes the rate of exchange for its currency with respect to another country's currency (or to a "basket" of several currencies).

   b. The pegging country then calculates its currency's movement with respect to the currencies of third countries based on the movements of the currency to which it has been pegged.

6. **Exchange Rate Basics**

   a. The **spot rate** is the number of units of a foreign currency that can be received today in exchange for a single unit of the domestic currency.

EXAMPLE 6-1 Spot Rate

A currency trader is willing to give 1.652 Swiss francs today in exchange for a single British pound. Today's spot rate for the pound is therefore 1.652 Swiss francs, and today's spot rate for the franc is £0.6053 (1 ÷ ₣1.652).

   b. The **forward rate** is the number of units of a foreign currency that can be received in exchange for a single unit of the domestic currency at some definite date in the future.

EXAMPLE 6-2 Forward Rate

The currency trader contracts to provide 1.654 Swiss francs in exchange for a single British pound 30 days from now. Today's 30-day forward rate for the pound is therefore 1.654 Swiss francs, and the 30-day forward rate for the franc is £0.6046 (1 ÷ ₣1.654).

   c. If the domestic currency exchanges for more units of a foreign currency in the forward market than in the spot market, the domestic currency is said to be trading at a **forward premium** with respect to the foreign currency.

EXAMPLE 6-3 Forward Premium

Since the pound exchanges for more francs in the forward market than in the spot market (₣1.654 > ₣1.652), the pound is currently trading at a forward premium with respect to the franc. This reflects the market's belief that the pound is going to increase in value in relation to the franc.

d. If the domestic currency exchanges for fewer units of a foreign currency in the forward market than in the spot market, the domestic currency is said to be trading at a **forward discount** with respect to the foreign currency.

EXAMPLE 6-4 Forward Discount

Since the franc exchanges for fewer pounds in the forward market than in the spot market (£0.6046 < £0.6053), the franc is currently trading at a forward discount with respect to the pound. This reflects the market's belief that the franc is going to lose value in relation to the pound.

e. The forward premium or discount on one currency with respect to another currency can be calculated by multiplying the percentage spread by the number of forward periods in a year:

Calculation of Forward Premium or Discount

$$\frac{\text{Forward rate} - \text{Spot rate}}{\text{Spot rate}} \times \frac{\text{Days in year}}{\text{Days in forward period}}$$

EXAMPLE 6-5 Forward Premium or Discount

Using the information in Examples 6-1 through 6-4:

Pound forward premium = [(₣1.654 – ₣1.652) ÷ ₣1.652] × (360 days ÷ 30 days)
= (₣0.002 ÷ ₣1.652) × 12
= 0.00121 × 12
= 1.45%

Franc forward discount = [(£0.6046 – £0.6053) ÷ £0.6053] × (360 days ÷ 30 days)
= (–£0.0007 ÷ £0.6053) × 12
= –0.00116 × 12
= –1.39%

f. The implications of these relationships can be generalized as follows:

If the domestic currency is trading at a forward	Then it is expected to
Premium	Gain purchasing power
Discount	Lose purchasing power

g. A **cross rate** is used when the two currencies involved are not stated in terms of each other. The exchange must be valued in terms of a third currency, very often the U.S. dollar.

$$\text{Cross rate} = \frac{\text{Domestic currency per U.S. dollar}}{\text{Foreign currency per U.S. dollar}}$$

EXAMPLE 6-6 Cross Rate

A firm in Sweden needs to make a payment of 100,000 yen today. However, the krona is not stated in terms of yen, so a cross rate must be calculated.

The spot rate for a single U.S. dollar at the time of the transaction is 6.8395 kronor and 79.8455 yen.

Cross rate = kr6.8395 ÷ ¥79.8455
= 0.0857 kronor per yen

The company needs kr8,570 to settle its debt (¥100,000 × 0.0857).

7. **Exchange Rates and Purchasing Power**

   a. The graph below depicts the relationship between the supply of and demand for a foreign currency by consumers and investors who use a given domestic currency:

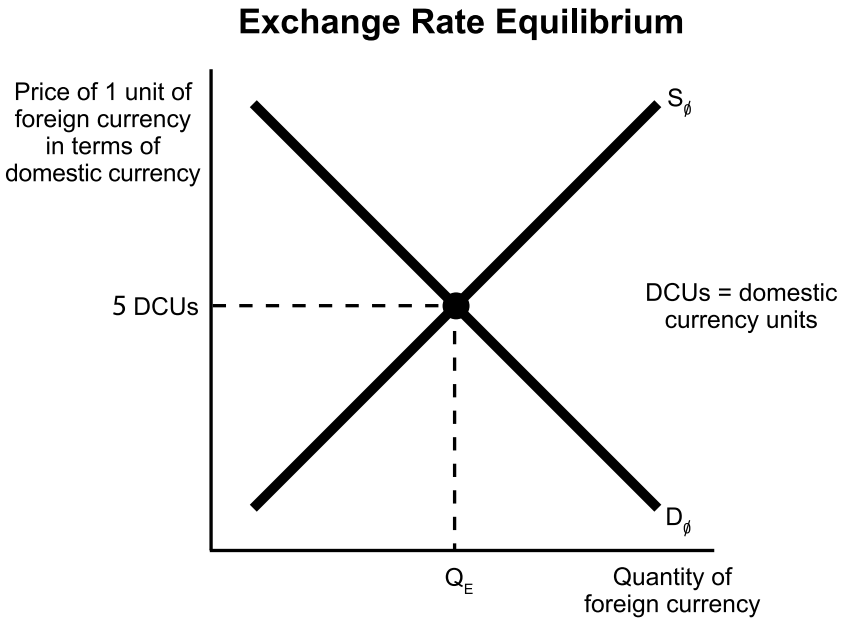


Figure 6-1

   1) The demand curve for the foreign currency is downward sloping because, when that currency becomes cheaper, goods and services denominated in that currency become more affordable to domestic consumers, leading them to demand more of that currency.

   2) The supply curve for the foreign currency is upward sloping because, when that currency becomes more expensive, goods and services become more affordable to users of the foreign currency, leading them to inject more of their currency into the domestic market.

8. **Appreciation and Depreciation Against Another Currency**

   a. When one currency gains purchasing power with respect to another currency, the first currency is said to have appreciated against the second currency.

      1) By the same token, the second currency is said to have depreciated (lost purchasing power) against the first.

   b. This phenomenon has definite implications for international trade.

EXAMPLE 6-7 Currency Depreciation

A U.S. company buys merchandise from an EU company for €1,000,000, due in 60 days. On the day of the sale, $0.795 is required to buy a single euro. By the 60th day, $0.812 is required to buy a euro.

The dollar has thus weakened against the euro, and the euro has strengthened against the dollar; i.e., the dollar has lost purchasing power with respect to the euro.

The U.S. firm only needed $795,000 to pay off a €1,000,000 debt on the date of sale but must now use $812,000 to pay off the €1,000,000 debt.

9. **Effective Interest Rate on a Foreign Currency Loan**

   a. When loans are taken out in foreign currencies, appreciation and depreciation of the two currencies can affect the value of interest and principal paid.

      1) This in turn can affect the effective interest rate.

EXAMPLE 6-8 Effective Interest Rate

A U.S. company takes out a 1-year, 12,000,000 peso loan at 6.5% to pay a Mexican supplier. After a year, the U.S. company repays the loan with interest, but in the meantime, the peso has experienced a slight appreciation. Thus, the company's effective rate on the loan is higher than the stated rate, calculated as follows:

		Times: Conversion Rate	Equals: Equivalent USD
Amount borrowed	12,000,000 Pesos	0.0921496	$1,105,795
Times: Stated rate	6.5%		
Equals: Interest charged	780,000 Pesos		
Total repayment	12,780,000 Pesos	0.0940000	1,201,320
Difference			$ 95,525
Effective rate:			
Difference ÷ Amount borrowed = ($95,525 ÷ $1,105,795)			**8.64%**

10. **Foreign Trade and a Country's Balance of Payments**

   a. A country's **balance of trade** is the difference between imports and exports of goods and services over a given period.

      1) If a country's currency is weak, its goods and services are more affordable to foreign consumers. These countries tend to have a **positive (surplus) balance of trade**.

      2) By the same token, if a country's currency is strong, its goods and services are more expensive to foreign consumers. These countries tend to have a **negative (deficit) balance of trade**.

   b. A country's **balance of payments** is the net of all transactions between domestic parties and parties in a particular foreign country.

      1) The balance of payments is a deficit (surplus) when the sum of imports, private capital outflow, grants, and remittances exceed (are less than) the sum of exports and private capital inflows.

   c. As a short-term measure, a government can attempt to correct a deficit balance of payments by deliberately devaluing its currency. This makes the country's goods more affordable, causing exports to rise.

      1) However, this approach has its own disadvantages. By making imports more expensive, consumers complain because they have fewer choices.

      2) Also, over the long run, domestic producers can raise their own prices to match those of the more expensive imported goods.

6.3 EXCHANGE RATES -- FACTORS AND RISK MITIGATION

1. Factors Affecting Exchange Rates

a. The five factors that affect currency exchange rates can be classified as three trade-related factors and two financial factors. Each is discussed in detail in items 2. and 3. beginning below.

1) Trade-related factors

a) Relative inflation rates
b) Relative income levels
c) Government intervention

2) Financial factors

a) Relative interest rates
b) Ease of capital flow

2. Trade-Related Factors That Affect Exchange Rates

a. **Relative Inflation Rates**

1) When the rate of inflation in a given country rises relative to the rates of other countries, the demand for that country's currency falls.

a) This inward shift of the demand curve results from the lowered desirability of that currency, a result of its falling purchasing power.

2) As investors unload this currency, there is more of it available, reflected in an outward shift of the supply curve.

3) A new equilibrium point will be reached at a lower price in terms of investors' domestic currencies.

a) An investor's domestic currency has gained purchasing power in the country where inflation is worse.

Changes in Supply and Demand for the Currency of a Foreign Country Experiencing Higher Relative Inflation

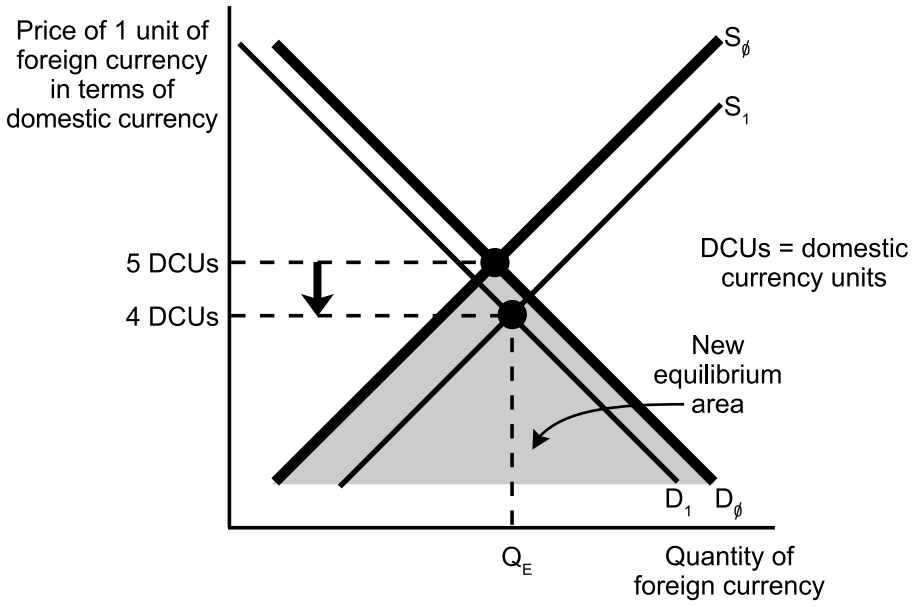


Figure 6-2

b. **Relative Income Levels**

1) Citizens with higher incomes look for new consumption opportunities in other countries, driving up the demand for those currencies and shifting the demand curve to the right.

a) Thus, as incomes rise in one country, the prices of foreign currencies rise as well, and the local currency will depreciate.

Changes in Supply and Demand for the Currency of a Foreign Country When Domestic Incomes Rise

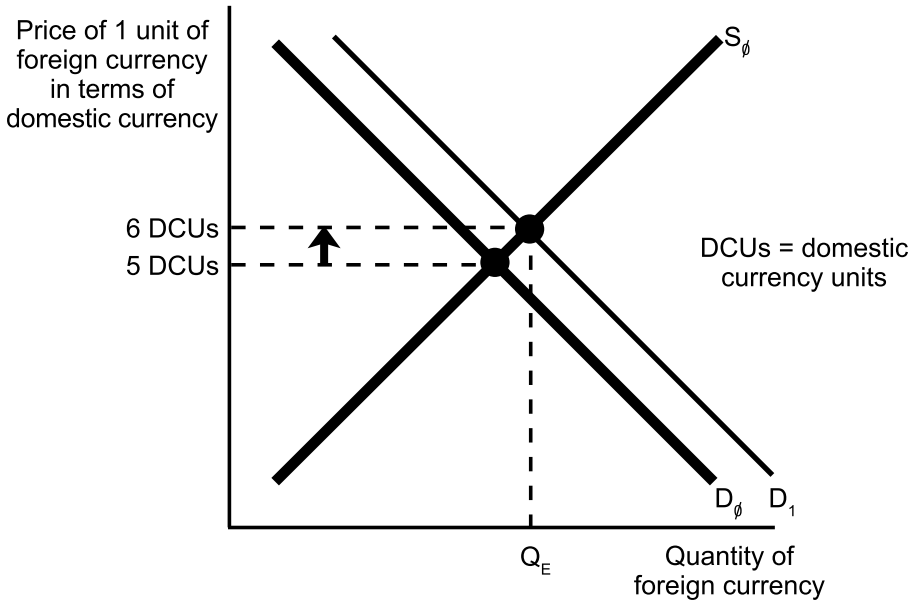


Figure 6-3

c. **Government Intervention**

1) Actions by national governments, such as trade barriers and currency restrictions, complicate the process of exchange rate determination.

3. Financial Factors That Affect Exchange Rates

a. Relative Interest Rates

1) When the interest rates in a given country rise relative to those of other countries, the demand for that country's currency rises.
   a) This outward shift of the demand curve results from the influx of other currencies seeking the higher returns available in that country.
2) As more and more investors buy up the high-interest country's currency with which to make investments, there is less of it available, reflected in an inward shift of the supply curve.
3) A new equilibrium point will be reached at a higher price in terms of investors' domestic currencies.
   a) An investor's domestic currency has lost purchasing power in the country paying higher returns.

Changes in Supply and Demand for the Currency of a Foreign Country Experiencing Rising Interest Rates

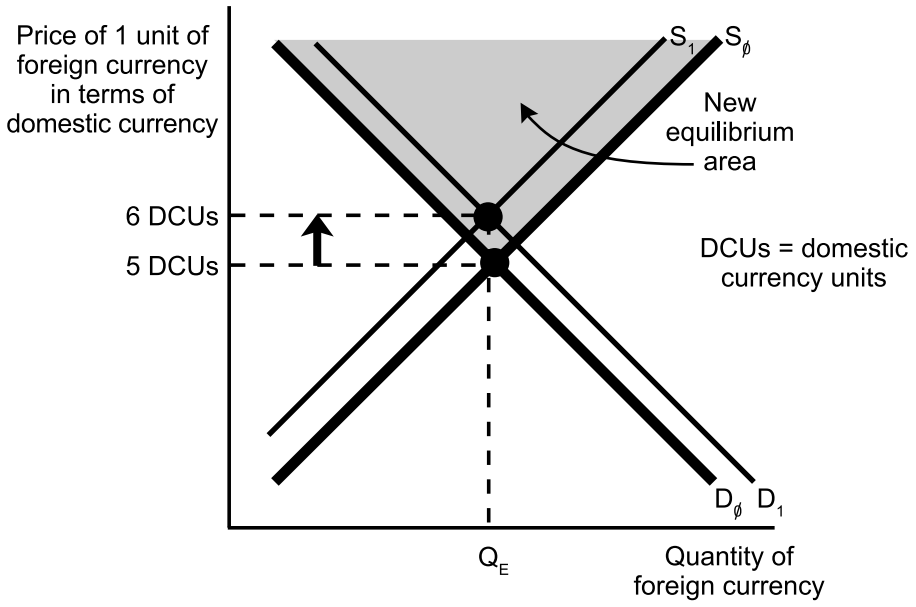


Figure 6-4

b. **Ease of Capital Flow**

1) If a country with high real interest rates loosens restrictions against the cross-border movement of capital, the demand for the currency will rise as investors seek higher returns.

2) This factor has become by far the most important of the five factors listed.

a) The speed with which capital can be moved electronically and the huge amounts involved in the "wired" global economy easily dominate the effects of the trade-related factors.

4. **Graphical Depiction**

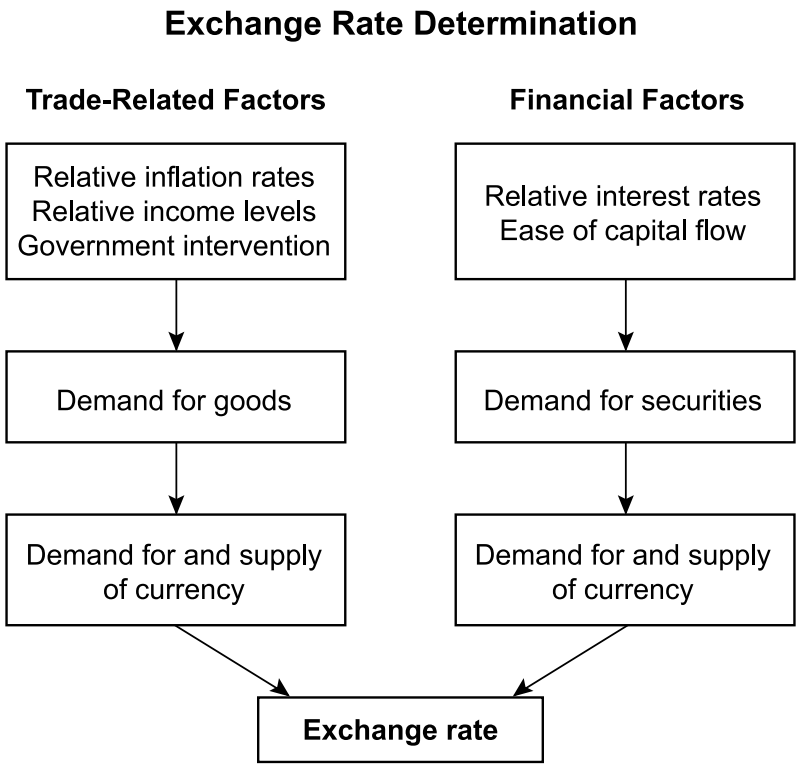


Figure 6-5

5. **Calculating Simultaneous Effects on Exchange Rates**

   a. Differential Interest Rates

      1) Interest rate parity (IRP) theory holds that exchange rates will settle at an equilibrium point where the difference between the forward rate and the spot rate (i.e., the forward premium or discount) equals the exact amount necessary to offset the difference in interest rates between the two countries.

   b. Differential Inflation Rates

      1) Purchasing power parity (PPP) theory explains differences in exchange rates as the result of the differing inflation rates in the two countries.

   c. International Fisher Effect (IFE) Theory

      1) IFE theory also focuses on how the spot rate will change over time, but it uses the interplay between real and nominal interest rates to explain the change.

         a) If all investors require a given real rate of return, then differences between currencies can be explained by each country's expected inflation rate.

   d. Aspects of the Three Theories

      1) The three theories can be summarized as follows:

Theory	Deals with	Explanatory Variable
Interest rate parity (IRP)	Forward rate	Interest rates
Purchasing power parity (PPP)	Percentage change in spot rate	Inflation rates
International Fisher Effect (IFE)	Percentage change in spot rate	Interest rates

      2) Each of the three theories isolates a single factor as the principal cause of exchange rate differences. However, as depicted in Figure 6-5 on the previous page, multiple factors are actually at work in the determination of exchange rates.

      3) With regard to high-inflation currencies,

         a) IRP theory suggests that they usually trade at large forward discounts.
         b) PPP and IFE theory suggest that they will weaken over time.
         c) IFE theory suggests that their economies will have high interest rates.

6. **Exchange Rate Fluctuations over Time**

   a. Long-term exchange rates are dictated by the purchasing-power parity theorem.

      1) In the long run, real prices should be the same worldwide (net of government taxes or trade barriers and transportation costs) for a given good. Exchange rates will adjust until purchasing-power parity is achieved.

      2) In other words, relative price levels determine exchange rates. In the real world, exchange rates do not perfectly reflect purchasing-power parity, but relative price levels are clearly important determinants of those rates.

   b. Medium-term exchange rates are dictated by the economic activity in a country.

      1) When the U.S. is in a recession, spending on imports (as well as domestic goods) will decrease. This reduced spending on imports shifts the supply curve for dollars to the left, causing the equilibrium value of the dollar to increase (assuming the demand for dollars is constant); that is, at any given exchange rate, the supply to foreigners is less.

      2) If more goods are exported because of an increased preference for U.S. goods, the demand curve for dollars shifts to the right, causing upward pressure on the value of the dollar.

      3) An increase in imports or a decrease in exports will have effects opposite to those described above.

   c. Short-term exchange rates are dictated by interest rates.

      1) Big corporations and banks invest their large reserves of cash where the real interest rate is highest. A rise in the real interest rate in a country will lead to an appreciation of the currency because it will be demanded for investment at the higher real interest rate, thereby shifting the demand curve to the right (outward).

      2) The reverse holds true for a decline in real interest rates because that currency will be sold as investors move their money out of the country.

      3) However, the interplay of interest rates and inflation must also be considered. Inflation of a currency relative to a second currency causes the first currency to depreciate relative to the second. Moreover, nominal interest rates increase when inflation rates are expected to increase.

Due to exchange rate fluctuations, there are risks involved with international trade. As a CMA candidate, you will need to be able to identify and be prepared to explain the methods used to mitigate the risks. Additionally, you should be able to analyze the best method to manage this risk with supporting calculations.

7. **Risks of Exchange Rate Fluctuation**

   a. A company has **transaction exposure** if its payables or receivables are denominated in a foreign currency.

   b. When a firm sells merchandise to a foreign customer, the firm's receivable might be denominated in the customer's currency.

      1) The downside risk to a **foreign-denominated receivable** is that the foreign currency might depreciate against the firm's domestic currency.

      2) If the foreign currency has depreciated by the settlement date, the firm will receive fewer units of its domestic currency than it would have if the transaction had been settled at the time of the sale.

   c. Likewise, when a firm buys merchandise from a foreign supplier, the firm's payable might be denominated in the supplier's currency.

      1) The downside risk to a **foreign-denominated payable** is that the foreign currency might appreciate against the firm's domestic currency.

      2) If the foreign currency has appreciated by the settlement date, the firm will be forced to buy more units of the foreign currency to settle the payable than it would have if the transaction had been settled at the time of the purchase.

Summary of Exchange Rate Risk

Foreign-Denominated Transaction	Results in a Foreign-Denominated	Downside Risk is that Foreign Currency
Sale	Receivable	Depreciates
Purchase	Payable	Appreciates

8. **Hedging Exchange Rate Risk**

   a. Hedging Reduces Uncertainty

      1) Exporters and importers are likely to use hedges to avoid the exchange rate risk in foreign currency transactions. Thus, hedging is not used by those who seek to gain from exchange rate variability.

         a) Hedging is the sale or purchase of a forward exchange contract to offset a possible exchange rate loss. If the contract is intended and effective as an economic hedge against an exposed net asset or net liability position (e.g., a receivable or liability measured in a foreign currency), an exchange gain or loss on the contract offsets an exchange gain or loss on the exposed position.

      2) Hedging sacrifices possible profit to avoid possible loss.

   b. Hedging a Foreign-Denominated Receivable

      1) When the downside risk is that the foreign currency will depreciate by the settlement date, the hedge is to sell the foreign currency forward to lock in a definite price.

EXAMPLE 6-9 Hedge -- Foreign-Denominated Receivable

A U.S. company knows that it will be receiving 5,000,000 pesos in 30 days from the sale of some equipment at one of its facilities in Mexico. The spot rate for a peso is $0.77, and the 30-day forward rate is $0.80. The firm wants to be sure that it will be able to sell the pesos it will be receiving in 30 days for $0.80 each. The firm thus hedges by selling 5,000,000 pesos 30 days forward. The company is buying a guarantee that it will be able to sell 5,000,000 pesos in 30 days and receive $4,000,000 (5,000,000 × $0.80) in return.

The spot rate on day 30 turns out to be $0.82. Thus, the U.S. company could have made more money by forgoing the hedge and simply waiting to convert the pesos on day 30. However, this possibility was not worth the risk that the peso might have fallen below $0.80.

The counterparty to the hedge just described (i.e., the buyer of pesos) might also be hedging but could be speculating or simply making a market in the instrument. The two parties are indifferent to each other's goals.

c. Hedging a Foreign-Denominated Payable

1) When the downside risk is that the foreign currency will appreciate by the settlement date, the hedge is to purchase the foreign currency forward to lock in a definite price.

EXAMPLE 6-10 Hedge -- Foreign-Denominated Payable

A U.S. company knows that it will need 100,000 Canadian dollars in 60 days to pay an invoice. The firm thus hedges by purchasing 100,000 Canadian dollars 60 days forward. The company is essentially buying a guarantee that it will have C$100,000 available for use in 60 days. The 60-day forward rate for a Canadian dollar is US $0.99. Thus, for the privilege of having a guaranteed receipt of 100,000 Canadian dollars, the company will commit now to paying $99,000 in 60 days.

The counterparty to the hedge just described (i.e., the seller of Canadian dollars) might also be hedging, but could be speculating or simply making a market in the instrument. The two parties are indifferent to each other's goals.

d. Managing Net Receivables and Payables Positions

1) A firm can reduce its exchange rate risk by maintaining a position in each foreign currency of receivables and payables that net to near zero.

2) Large multinational corporations often establish multinational netting centers as special departments to execute whichever strategy is selected.

a) They enter into foreign currency futures contracts when necessary to achieve balance.

9. **Tools for Mitigating Exchange Rate Risk -- Short-Term**

   a. **Money Market Hedges**

      1) The least complex tool for hedging exchange rate risk is the money market hedge.
      2) A firm with a receivable denominated in a foreign currency can borrow the amount and convert it to its domestic currency now, then pay off the foreign loan when the receivable is collected.
      3) A firm with a payable denominated in a foreign currency can buy a money market instrument denominated in that currency that is timed to mature when the payable is due. Exchange rate fluctuations between the transaction date and the settlement date are avoided.

   b. **Futures Contracts**

      1) Futures contracts are essentially commodities that are traded on an exchange, making them available to more parties.
      2) Futures contracts are only available for generic amounts (e.g., 62,500 British pounds, 100,000 Brazilian reals, 12,500,000 Japanese yen) and with specific settlement dates (typically the third Wednesday in March, June, September, and December).
      3) Because futures contracts are impersonal, the two parties need never know each other's identity.

   c. **Currency Options**

      1) Two types of options are available:
         a) A call option gives the holder the right to buy (i.e., call for) a specified amount of currency in a future month at a specified price. Call options are among the many tools available to hedge payables.
         b) A put option gives the holder the right to sell (i.e., put onto the market) a specified amount of currency in a future month at a specified price. Put options are among the many tools available to hedge receivables.
      2) Currency options are available from two sources: options exchanges (similar to those for futures contracts) and the over-the-counter market.
         a) Exchange-traded options are only available for predefined quantities of currency.
         b) Options available in over-the-counter markets are provided by commercial banks and brokerage houses.
      3) An option is exercised only if the party purchasing the option chooses to.

10. **Tools for Mitigating Exchange Rate Risk -- Long-Term**

    a. **Forward Contracts**

        1) Large corporations that have close relationships with major banks are able to enter into contracts for individual transactions concerning large amounts. These contracts are unavailable to smaller firms or firms without a history with a particular bank.

        2) The bank guarantees that it will make available to the firm a given quantity of a certain currency at a definite rate at some point in the future. The price charged by the bank for this guarantee is called the premium.

EXAMPLE 6-11 Forward Contract

A large U.S. firm purchases equipment from a Korean manufacturer for 222,000,000 won, due in 90 days. The exchange rate on the date of sale is $1 to 1,110 won. The U.S. firm suspects that the won may appreciate over the next 90 days and wants to lock in a forward rate of 1-to-1,110. The firm negotiates a contract whereby its bank promises to deliver 222,000,000 won to the firm in 90 days for $200,000. In return for this guarantee, the firm will pay the bank a 2% premium ($200,000 × 2% = $4,000).

    b. **Currency Swaps**

        1) A broker brings together two parties who would like to hedge exchange rate risk by swapping cash flows in each other's currency.

EXAMPLE 6-12 Currency Swap

The Australian owner of a new office building in Shanghai is currently signing 20-year lease agreements with tenants. At the same time, a Shanghai-based consultant has just signed a 20-year outsourcing contract in Melbourne. The Australian landlord is going to have cash flows denominated in yuan, and the Chinese consultant is going to have cash flows denominated in Australian dollars.

A broker working for a large investment bank engineers an agreement whereby the two will exchange cash flows each month for the next 20 years. A mechanism is agreed upon to determine the appropriate exchange rate.

11. An individual who purposely accepts exchange rate risk is a speculator. **Speculators** buy and sell foreign currencies in anticipation of favorable changes in rates.

12. An **arbitrageur** simultaneously buys foreign currency in one market and sells in another market at a slightly higher price. Thus, the arbitrageur's risk is low.

6.4 EFFECTS OF FOREIGN EXCHANGE FLUCTUATIONS

1. Definitions

a. The **functional currency** is the currency of the primary economic environment in which the entity operates. Normally, that environment is the one in which it primarily generates and expends cash.

b. A **foreign currency** is any currency other than the entity's functional currency.

c. The **reporting currency** is the currency in which an entity prepares its financial statements.

d. **Foreign currency transactions** are fixed in a currency other than the functional currency. They result when an entity

1) Buys or sells on credit;

2) Borrows or lends;

3) Is a party to a derivative instrument; or,

4) For other reasons, acquires or disposes of assets, or incurs or settles liabilities, fixed in a foreign currency.

2. Aspects of Cross-Border Transactions

a. Transactions are recorded at the spot rate in effect at the transaction date.

b. Transaction gains and losses are recorded at each balance sheet date and at the date the receivable or payable is settled. The gains or losses ordinarily are included in the determination of net income.

c. When the amount of the functional currency exchangeable for a unit of the currency in which the transaction is fixed increases, a transaction gain or loss is recognized on a receivable or payable, respectively. The opposite occurs when the exchange rate (functional currency to foreign currency) decreases.

3. Exchange Rate Exposure

a. When a U.S. firm purchases from, or sells to, an entity in a foreign country, the transaction is recorded in U.S. dollars (the firm's domestic currency).

Foreign sale:		
Accounts receivable	$100,000	
Sales		$100,000
Foreign purchase:		
Inventory	$100,000	
Accounts payable		$100,000

1) The dollar, however, might not be the currency in which the transaction will have to be settled (typically 30 days later).

2) If the exchange rate of the two currencies (i.e., the units of one currency required to purchase a single unit of the other) is fixed, the existence of a foreign-denominated receivable or payable raises no measurement issue.

b. If the exchange rate is not fixed, however, as is the case with most pairs of currencies in today's managed float exchange rate environment (item 4. in Subunit 6.2), it is extremely rare for the two currencies to still have the same exchange rate at the end of the deferral period as they had at the beginning.

1) It is highly likely, then, that the firm will incur a gain or loss on this transaction arising from a change in the exchange rates.

c. The gains and losses arising from exchange rate fluctuations are of two types:

1) The gain or loss incurred at the settlement date, which affects the firm's cash flows, is termed a **transaction gain or loss**.

a) Transaction gains and losses, and their associated risk-mitigation techniques, are the subject of Subunit 6.3.

2) The other type of gain or loss, which does not affect cash flows, is termed a **translation gain or loss**.

a) Translation gains and losses arise from the use of accrual-basis accounting and must be calculated whenever financial statements are prepared during the payment deferral period.

4. **Two-Transaction Perspective on Exchange Rate Fluctuations**

a. Two-transaction treatment is in accordance with U.S. GAAP.

1) The rationale underlying the two-transaction perspective is that the purchase or sale of merchandise is one transaction, and the future acquisition of foreign currency (either to pay a liability or as proceeds from a sale) is a separate transaction.

2) By not settling immediately, the importer or exporter has assumed some degree of exchange rate risk, which is a financing decision, not a merchandising decision. These exchange gains or losses could have been avoided if full settlement had been made on the date of the purchase or sale.

b. One-transaction treatment is impermissible under U.S. GAAP.

1) The one-transaction perspective views all aspects of an exchange as a single transaction. Accordingly, for foreign trade activities, the original amount recorded is considered an estimate, subject to adjustment when the exact cash outlay required for the purchase or the exact cash received from the sale is known.

2) The one-transaction perspective emphasizes the cash-payment aspect of the exchange and views the transaction as incomplete until it is finally settled.

5. **Accounting for Transaction Gains and Losses**

a. A **transaction gain (loss)** results from a change in exchange rates between the functional currency and the currency in which the transaction is denominated. It is the change in functional currency cash flows

1) Actually realized on settlement and
2) Expected on unsettled transactions.

b. Transactions are recorded at the spot rate in effect at the transaction date.

c. Transaction gains and losses are recorded at each balance sheet date and at the date the receivable or payable is settled. The gains or losses ordinarily are **included in earnings**.

d. When the amount of the functional currency exchangeable for a unit of the currency in which the transaction is fixed increases, a transaction gain or loss is recognized on a receivable or payable, respectively. The opposite occurs when the exchange rate (functional currency to foreign currency) decreases.

EXAMPLE 6-13 Transaction Gains and Losses

On December 15, Year 1, Boise Co. purchased electronic components from Kinugasa Corporation. Boise must pay Kinugasa ¥15,000,000 on January 15, Year 2. The exchange rate in effect on December 15, Year 1, was $.01015 per yen, giving the transaction a value on Boise's books of $152,250 (¥15,000,000 × $.01015).

Transaction Date:		
Inventory	$152,250	
Accounts payable		$152,250

The exchange rate on December 31, Year 1, Boise's reporting date, has fallen to $.01010 per yen. The balance of the payable must be adjusted in the amount of $750 [(¥15,000,000 × ($.01015 – $.01010)].

Reporting Date:		
Accounts payable	$750	
Transaction gain		$750

The exchange rate on January 15, Year 2, has risen to $.01020 per yen. To settle the payable, the balance must be adjusted in the amount of $1,500 [¥15,000,000 × ($.01010 – $.01020)].

Settlement Date:		
Accounts payable ($152,250 – $750)	$151,500	
Transaction loss	1,500	
Cash		$153,000

e. The occurrence of transaction gains and losses can be summarized as follows:

Effects of Exchange Rate Fluctuations

Transaction That Will Be Settled in a Foreign Currency	Results in a Foreign-Denominated	Foreign Currency Appreciates	Foreign Currency Depreciates
Sale	Receivable	Transaction gain	Transaction loss
Purchase	Payable	Transaction loss	Transaction gain

6. **Remeasurement**

a. If the accounting records of a foreign entity are maintained in a currency not the functional currency, foreign currency amounts must be remeasured into the functional currency using the **temporal method**. They then are translated into the reporting currency using the **current-rate method**.

b. **Nonmonetary** balance sheet items and related revenue, expense, gain, and loss amounts are remeasured at the **historical rate**.

1) Examples are (a) marketable securities carried at cost (but not debt securities to be held to maturity); (b) inventories carried at cost; (c) cost of goods sold; (d) prepaid expenses; (e) property, plant, and equipment; (f) depreciation; (g) intangible assets; (h) amortization of intangible assets; (i) deferred income; (j) common stock; (k) preferred stock carried at its issuance price; and (l) any noncontrolling interest.

c. **Monetary** items are remeasured at the **current rate**.

1) The following are examples of monetary items:

a) Receivables
b) Payables
c) Inventories carried at market
d) Marketable securities carried at fair value

d. Any net **gain or loss** on remeasurement of monetary assets and liabilities is recognized in current **income from continuing operations**. This accounting treatment was adopted because gains or losses on remeasurement affect functional currency cash flows.

1) Maintaining the records of a subsidiary in a local currency not the functional currency increases earnings volatility.

2) All ratios that use current earnings or its components are affected by exchange rate fluctuations during the remeasurement process.

7. **Translation**

a. Translation is necessary when the functional currency differs from the reporting currency.

1) Assets and liabilities are restated using the **current exchange rate** on the reporting date.

a) Shareholders' equity items are restated at their **historical rates**.

2) Revenues, expenses, gains, and losses are restated using the historical rates in effect when they were recognized. If this method is impracticable, a weighted-average rate for the period may be used.

b. A gain or loss on foreign currency translation is a component of **other comprehensive income**, not earnings.

1) Thus, even large exchange rate fluctuations between the functional and reporting currencies will have little effect on income statement ratios.

EXAMPLE 6-14 Differing Currencies

A U.S.-based conglomerate has a subsidiary in Poland that keeps its books using the zloty (Ź), its local currency. However, since its primary operations involve Eurozone activities, its functional currency is the euro (€). To prepare the consolidated financial statements, the parent first must remeasure all unsettled transactions of the subsidiary from zloties to euros. These remeasured amounts are then translated into dollars ($).

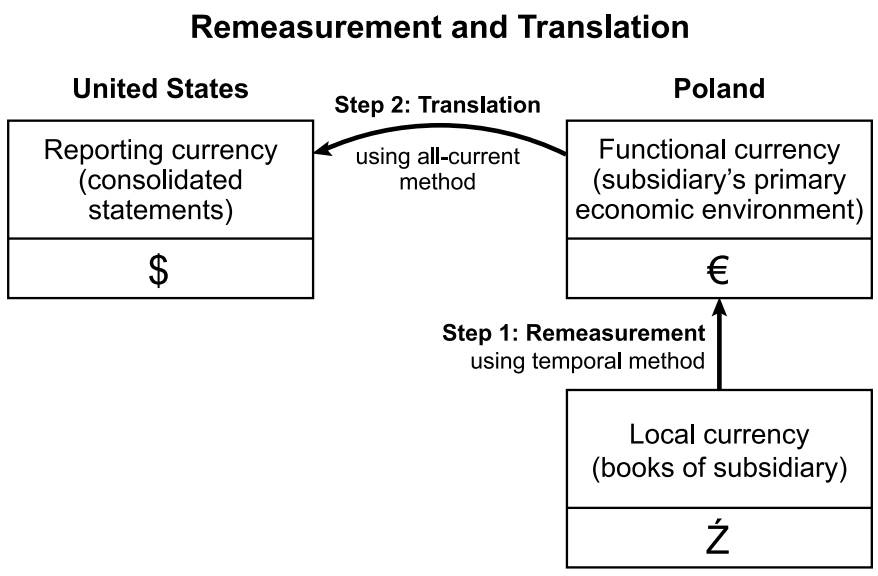


Figure 6-6

6.5 INTERNATIONAL TRADE

1. Analysis of Foreign Investments

a. Valid reasons for expansion of international business include

1) Securing a new source of raw materials
2) Expanding into new markets
3) Seeking lower costs of production
4) Avoiding trade restrictions

b. A company planning a foreign investment can either purchase the stock of a foreign corporation or make a **direct foreign investment**. A direct foreign investment involves buying equipment and buildings for a new company. The advantages of a direct foreign investment include

1) Lower taxes in the foreign nation
2) Annual depreciation allowances for the amount invested
3) Access to foreign capital sources
4) Avoiding trade restrictions imposed on foreign companies in the customers' market

c. Cost of capital for foreign projects is higher because of the increased

1) Exchange-rate risk and the purchasing power parity.
2) Sovereignty (or political) risk from possible expropriation (or other restrictions), with net losses to the parent company. Rebellions could result in destruction of assets, and governments may impose foreign exchange controls that limit the repatriation of profits.
3) The likelihood of laws requiring financing from certain sources, such as a requirement that foreign subsidiaries must be at least 51% owned by locals.

d. Foreign operations are more difficult to manage than domestic operations.

e. Ownership rights in foreign corporations are sometimes evidenced by American Depository Receipts (ADRs). The foreign stocks are deposited with a large U.S. bank, which in turn issues ADRs representing ownership in the foreign shares. The ADR shares then trade on a U.S. stock exchange, whereas the company's original shares trade in foreign stock markets. ADRs allow Americans to invest abroad and foreigners to raise capital in the U.S.

f. Investments in foreign operations may reduce the risks of domestic operations. For example, a foreign investment with returns negatively correlated with domestic returns mitigates the risk of domestic losses.

2. Multinational Corporations

a. **Benefits to the home country** include

1) Improved earnings and exports of products to foreign subsidiaries
2) Improved ability to obtain scarce resources
3) The typical benefits of free trade, i.e., greater product availability, a better international monetary system, and improved international understanding

b. **Adverse effects on the home country** include

1) Loss of jobs and tax revenues
2) Instability caused by reduced flexibility of operation in a foreign political system and the risk of expropriation
3) Competitive advantage of multinationals over domestic rivals

c. **Benefits to the host country** include

1) New investment of capital, technology, and management abilities
2) Improvements in output and efficiency along with the resulting stronger balance of payments
3) Stimulation of competition, increased tax revenues, and higher standard of living

d. **Adverse effects on the host country** include

1) Remittance of royalties, dividends, and profits that can result in a net capital outflow
2) Setting of transfer prices among subsidiaries so that profits will be earned where taxes are lowest or restrictions on the export of profits are least stringent
3) Multinationals engaging in anticompetitive activities, such as the formation of cartels

3. **Methods of Financing International Trade**

a. **Cross-Border Factoring**

1) A factor purchases receivables and assumes the risk of collection.
2) Cross-border factoring is a method of consummating a transaction by a network of factors across borders. The exporter's factor contacts correspondent factors in other countries to assist in the collection of accounts receivable.

b. **Letters of Credit**

1) Under a letter of credit, an issuer (usually a bank) undertakes with the account party (an importer-buyer that obtains the letter of credit) to verify that the beneficiary (seller-exporter) has performed under the contract, e.g., by shipping goods.
2) Thus, the issuer pays the beneficiary when it presents documents (such as bills of lading) that provide evidence of performance. The issuer then is reimbursed by the account party.

c. **Banker's Acceptances**

1) Banker's acceptances are time drafts drawn on deposits in a bank. They are short-term credit investments created by a nonfinancial firm with payment guaranteed (accepted) by a bank. These are essentially **commercial drafts**. A draft contains an order by the drawer to the drawee to pay a fixed sum of money to the payee.
2) Acceptances are traded at discounts in secondary markets. These instruments have been a popular investment for money market funds.

d. **Forfaiting**

1) Forfaiting is a form of factoring that involves the sale by exporters of large, medium- to long-term receivables to buyers (forfaiters) who are willing and able to bear the costs and risks of credit and collections.

e. **Countertrade**

1) Countertrade at its simplest is barter, the exchange of goods or services for other goods or services rather than merely for cash.

f. **Sight Draft or Bill of Exchange**

1) An exporter uses a sight draft to obtain payment from an importer. The exporter holds title to the shipped goods until the importer has received the shipment and paid for it. The sight draft and shipping documents are sent to the importer's bank, which remits payment to the exporter.

g. **Open Account Sale**

1) A sale on open-account is risky because the exporter merely ships the goods to the importer, who signs an invoice acknowledging receipt. Thus, the exporter is not assured of payment if the importer defaults. Such an arrangement is most likely if the parties have previously transacted business.

h. **Prepayment**

1) Under a prepayment arrangement, the exporter will not ship the goods until the buyer has wired payment into the exporter's bank account. First-time buyers of unknown creditworthiness and buyers in financially troubled countries are often required to prepay. Established buyers are rarely willing to assume the risk that comes with prepayment.

4. **International Tax Considerations**

a. Multinational corporations frequently derive income from several countries. The government of each country in which a corporation does business may enact statutes imposing one or more types of tax on the corporation.

1) To avoid double taxation, two or more countries may adopt treaties to coordinate or synchronize the effects of their taxing statutes.

2) Most countries tax only the income sourced to that country.

3) The U.S. taxes worldwide income (from whatever source derived) of a domestic corporation. Double taxation is avoided by allowing a credit for income tax paid to foreign countries or by treaty provisions.

4) In the case of foreign corporations, the U.S. taxes only income sourced to the U.S. Ordinarily, such income is effectively connected with engaging in a trade or business of the U.S. Certain U.S. source income, e.g., gain on the sale of most stock, is not taxed by the U.S.

b. **Transfer pricing** is an important aspect of the tax calculation for multinational corporations that transfer inventories between branches in different countries.

1) The U.S. tax laws have limits on the amount of profit that can be transferred from a U.S. parent to a foreign subsidiary or branch.

2) Thus, transfer prices charged to foreign subsidiaries may differ substantially from those charged to domestic subsidiaries.

3) The existence of tariffs in the foreign country may necessitate a lower transfer price to reduce a tariff based on the inventory value.

STUDY UNIT SEVEN

RATIO ANALYSIS

This study unit is the **first of two** on **financial statement analysis**. The relative weight assigned to this major topic in Part 2 of the exam is **20%**. The two study units are

Study Unit 7: Ratio Analysis
Study Unit 8: Activity Measures and Financing

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

7.1 QUALITIES OF RATIO ANALYSIS

1. Overview
   a. Ratio analysis is an important tool for analyzing a firm's financial performance.
      1) Ratios are not useful unless they can be compared against a standard or benchmark.
      2) The following are common benchmarks to use in ratio analysis:
         a) Industry norm. This is the most common type of comparison.
         b) Aggregate economy.
         c) Firm's past performance.
   b. Ratio analysis can be used to analyze financial statements, judge efficiency, locate weakness, formulate plans, and compare performance.
      1) Different users, such as management, investors, and creditors, use ratio analysis to determine the financial health of a firm for their decision-making purposes.
      2) Ratios can provide insights into how efficiently and effectively the firm has been able to use its resources and earn profits.
         a) Ratios can be used to identify weaknesses even when the firm as a whole is operating effectively.
         b) Management then can target those weak areas for improvement.
      3) Ratios also can be used to formulate plans.
         a) Progress toward the achievement of these plans can be tracked by analyzing the changes in ratios over time.

c. Ratio analysis provides the tools to determine how well a firm is performing over the years compared to other similar firms.

1) Firms can also determine how well different divisions are performing among themselves in different years.

2. Ratio analysis is subject to inherent limitations that can affect its usefulness.

a. Ratios are constructed from accounting data, much of which is subject to estimation. Also, **accounting profit** differs from **economic profit**. Economic profit is the excess of revenues over explicit and implicit costs. Accounting profit, however, does not account for implicit costs. This difference is covered in detail in Study Unit 11, Subunit 1.

1) Many studies have found a relationship between accounting data and stock prices. Thus, managers may manipulate accounting data to improve results.

2) One reason for manipulation is the observed tendency of the stock price of a public company to continue to move upward or downward for months after an earnings announcement, depending on whether the report was favorable or unfavorable, respectively.

b. A firm's management has an incentive to **window dress** financial statements to improve results.

1) For example, if the current or quick ratio is greater than 1.0, paying liabilities on the last day of the year will increase the ratio.

c. Development of ratios for comparison with **industry averages** is more useful for firms that operate within a particular industry than for conglomerates (firms that operate in a variety of industries).

1) For comparison purposes, industry averages can be obtained from industry journals and sources, such as Robert Morris Associates and Standard & Poor's.

2) Size differentials among firms affect comparability because of differences in access to and cost of capital, economies of scale, and width of markets.

3) Generalizations regarding which ratios are strong indicators of a firm's financial position may change from industry to industry, firm to firm, and division to division.

4) Industry averages may include data from capital-intensive and labor-intensive firms. They may also include data from firms with greatly divergent policies regarding leverage.

a) Some industry averages may be based on small samples.

d. **Earnings quality** is a measure of how useful reported earnings are as a performance indicator. If earnings have a high degree of variability, many ratios will become less meaningful.

1) Consistency of earnings is an aspect of quality. A company that has widely varying earnings levels from year to year will be said to have a low level of earnings quality because looking at a single year's earnings will not reveal anything about the long-term aspects of the company.

2) Earnings quality is enhanced when a firm uses certain accounting principles as opposed to others. For example, the use of declining-balance depreciation enhances earnings because assets are written down earlier than if straight-line depreciation were used. Similarly, during a period of inflation, LIFO earnings quality is higher than that of FIFO.

3) **Earnings power** is a related concept. It is the capacity of a firm's operations to produce cash inflows. A predictably stable pattern of earnings is the optimal source of funds for payment of fixed charges, long-term debt, and future dividends.

e. Variances in ratio analysis could entirely, or in part, be attributed to inflation.

1) For example, if LIFO is used, fixed assets and depreciation as well as inventory will be understated.

2) The interest rate increases that accompany inflation will decrease the value of outstanding long-term debt.

3) Many assets are recorded at **historical cost**, so their fair value may not be reflected on the balance sheet.

f. Comparability of financial statement amounts and the ratios derived from them is impaired if different firms choose different **accounting policies**. Also, changes in a firm's own accounting policies may create some distortion in the comparison of the results over a period of years.

1) Current performance and trends may be misinterpreted if sufficient years of historical analysis are not considered.

2) Some data may be presented either before or after taxes.

3) Comparability among firms may be impaired if they have different fiscal years.

g. Ratio analysis may be affected by **seasonal factors**.

1) For example, inventory and receivables may vary widely, and year-end balances may not reflect the averages for the period.

h. The geographical locations of firms may affect comparability because of differences in labor markets, price levels, governmental regulation, taxation, and other factors.

i. Ratio analysis may be applied ineffectively.

1) Ratio analysis may be distorted by failing to use an average or weighted average.

2) Different sources of information may compute ratios differently.

3) Misleading conclusions may result if improper comparisons are selected.

4) Whether a certain level of a ratio is favorable depends on the underlying circumstances. For example, a high quick ratio indicates high liquidity, but it may also imply that excessive cash is being held.

5) Different ratios may yield opposite conclusions about a firm's financial health. Thus, the net effects of a set of ratios should be analyzed.

7.2 LIQUIDITY RATIOS -- CALCULATIONS

1. Liquidity

a. Liquidity is a firm's ability to pay its **current obligations** as they come due and thus remain in business in the short run. Liquidity reflects the ease with which assets can be converted to cash.

1) Liquidity ratios measure this ability by relating a firm's liquid assets to its current liabilities.

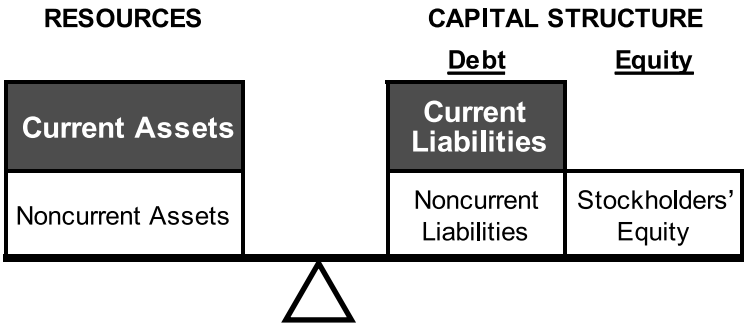


Figure 7-1

b. EXAMPLE of a balance sheet:

RESOURCES			FINANCING		
CURRENT ASSETS:	**Current Year End**	**Prior Year End**	**CURRENT LIABILITIES:**	**Current Year End**	**Prior Year End**
Cash and equivalents	$ 325,000	$ 275,000	Accounts payable	$ 150,000	$ 75,000
Available-for-sale securities	165,000	145,000	Notes payable	50,000	50,000
Accounts receivable (net)	120,000	115,000	Accrued interest on note	5,000	5,000
Notes receivable	55,000	40,000	Current maturities of L.T. debt	100,000	100,000
Inventories	85,000	55,000	Accrued salaries and wages	15,000	10,000
Prepaid expenses	10,000	5,000	Income taxes payable	70,000	35,000
Total current assets	**$ 760,000**	**$ 635,000**	**Total current liabilities**	**$ 390,000**	**$ 275,000**
NONCURRENT ASSETS:			**NONCURRENT LIABILITIES:**		
Equity-method investments	$ 120,000	$ 115,000	Bonds payable	$ 500,000	$ 600,000
Property, plant, and equipment	1,000,000	900,000	Long-term notes payable	90,000	60,000
Less: Accum. depreciation	(85,000)	(55,000)	Employee-related obligations	15,000	10,000
Goodwill	5,000	5,000	Deferred income taxes	5,000	5,000
Total noncurrent assets	**$1,040,000**	**$ 965,000**	**Total noncurrent liabilities**	**$ 610,000**	**$ 675,000**
			Total liabilities	**$1,000,000**	**$ 950,000**
			STOCKHOLDERS' EQUITY:		
			Preferred stock, $50 par	$ 120,000	$ 0
			Common stock, $1 par	500,000	500,000
			Additional paid-in capital	110,000	100,000
			Retained earnings	70,000	50,000
			Total stockholders' equity	**$ 800,000**	**$ 650,000**
Total assets	**$1,800,000**	**$1,600,000**	**Total liabilities and stockholders' equity**	**$1,800,000**	**$1,600,000**

NOTE: This balance sheet provides input for the examples throughout this study unit.

c. Current assets are the most liquid. They are expected to be converted to cash, sold, or consumed within 1 year or the operating cycle, whichever is longer. Ratios involving current assets thus measure a firm's ability to continue operating in the short run.

1) Current assets include, in descending order of liquidity, cash and equivalents; marketable securities; receivables (net of allowance for uncollectible accounts); inventories; and prepaid items.

d. Current liabilities, by the same token, are ones that must be settled the soonest. Specifically, they are expected to be settled or converted to other liabilities within 1 year or the operating cycle, whichever is longer.

1) Current liabilities include accounts payable, notes payable, current maturities of long-term debt, unearned revenues, taxes payable, wages payable, and other accruals.

e. Net working capital reports the resources the company would have to continue operating in the short run if it had to liquidate all of its current liabilities at once.

Net Working Capital

Current assets – Current liabilities

1) EXAMPLE: Current Year: $760,000 – $390,000 = $370,000
Prior Year: $635,000 – $275,000 = $360,000

a) Although the company's current liabilities increased, its current assets increased by $10,000 more.

2. **Liquidity Ratios**

a. The **current ratio** is the most common measure of liquidity.

Current Ratio

$$\frac{\text{Current assets}}{\text{Current liabilities}}$$

1) EXAMPLE: Current Year: $760,000 ÷ $390,000 = 1.949
Prior Year: $635,000 ÷ $275,000 = 2.309

a) Although working capital increased in absolute terms ($10,000), current assets now provide less proportional coverage of current liabilities than in the prior year.

2) A low ratio indicates a possible solvency problem.

a) A firm with a low current ratio may become insolvent. Therefore, care should be taken when determining whether to extend credit to a firm with a low ratio.

3) An overly high ratio indicates that management may not be investing idle assets productively.

4) The quality of accounts receivable and merchandise inventory should be considered before evaluating the current ratio.

a) Obsolete or overvalued inventory or receivables can artificially inflate the current ratio.

5) The general principle is that the current ratio should be proportional to the operating cycle. Thus, a shorter cycle may justify a lower ratio.

a) For example, a grocery store has a short operating cycle and can survive with a lower current ratio than could a gold mining company, which has a much longer operating cycle.

b. The **quick (acid test) ratio** excludes inventories and prepaids from the numerator, recognizing that those assets are difficult to liquidate at their stated values. The quick ratio is thus a more conservative measure than the basic current ratio.

Quick (Acid Test) Ratio

$$\frac{\text{Cash + Marketable securities + Net receivables}}{\text{Current liabilities}}$$

1) EXAMPLE: Current Year: ($325,000 + $165,000 + $120,000 + $55,000) ÷ $390,000 = 1.705
Prior Year: ($275,000 + $145,000 + $115,000 + $40,000) ÷ $275,000 = 2.091

a) In spite of its increase in total working capital, the company's position in its most liquid assets deteriorated significantly.

2) This ratio measures the firm's ability to easily pay its short-term debts and avoids the problem of inventory valuation.

c. The **cash ratio** is an even more conservative variation.

Cash Ratio

$$\frac{\text{Cash + Marketable securities}}{\text{Current liabilities}}$$

1) EXAMPLE: Current Year: ($325,000 + $165,000) ÷ $390,000 = 1.256
Prior Year: ($275,000 + $145,000) ÷ $275,000 = 1.527

a) In this working capital measure, the company's position declined, but coverage is still positive; i.e., the ratio is greater than 1.

d. The **cash flow ratio** reflects the significance of cash flow for settling obligations as they become due.

Cash Flow Ratio

$$\frac{\text{Cash flow from operations}}{\text{Current liabilities}}$$

1) EXAMPLE: The company's cash flows from operations for the two most recent years were $382,000 and $291,000, respectively.

Current Year: $382,000 ÷ $390,000 = 0.979
Prior Year: $291,000 ÷ $275,000 = 1.058

a) Unlike the prior year, the cash flows generated by the company in the most recent year were not sufficient to cover current liabilities.

e. The **net working capital ratio** is the most conservative of the working capital ratios.

Net Working Capital Ratio

$$\frac{\text{Current assets – Current liabilities}}{\text{Total assets}}$$

1) EXAMPLE: Current Year: ($760,000 – $390,000) ÷ $1,800,000 = 0.206
Prior Year: ($635,000 – $275,000) ÷ $1,600,000 = 0.225

a) Current liabilities are taking a bigger "bite" out of working capital than in the prior year.

3. **Liquidity of Current Liabilities**

   a. The liquidity of current liabilities is the ease with which a firm can issue new debt or raise new structured (convertible, puttable, callable, etc.) funds.

      1) The liquidity of current liabilities indicates the ease of funding or availability of sources of funding. A firm's ability to borrow in the financial markets is generally a function of its size, reputation, creditworthiness, and capital levels.

      2) Raising liquidity during an adverse situation often requires a combination of both asset liquidity and liability liquidity.

7.3 LIQUIDITY RATIOS -- EFFECTS OF TRANSACTIONS

Some of the questions pertaining to liquidity ratios that a candidate will encounter on the CMA exam focus on the effects that typical business transactions have on a firm's liquidity rather than on the mechanics of calculating the ratios. This subunit consists entirely of such questions. Please review Subunit 7.2 before attempting to answer the questions in this subunit.

7.4 PROFITABILITY RATIOS -- CALCULATIONS

1. **Income Statement Percentages**

   a. Gross profit margin is the percentage of gross revenues that remains with the firm after paying for merchandise. The key analysis with respect to the gross profit margin is whether it remains stable with any increase or decrease in sales.

$$\textbf{Gross Profit Margin Ratio} = \frac{\text{Net sales} - \text{Cost of goods sold}}{\text{Net sales}}$$

      1) For example, a 10% increase in sales should be accompanied by at least a 10% increase in gross profit. Thus, the gross profit margin should remain relatively constant at different sales levels.

   b. Operating profit margin is the percentage that remains after selling and general and administrative expenses have been paid.

$$\textbf{Operating Profit Margin} = \frac{\text{Operating income}}{\text{Net sales}}$$

      1) The ratio of net operating income to sales may also be defined as earnings before interest and taxes (EBIT) divided by net sales.

c. **Net profit margin** is the percentage that remains after other gains and losses (including interest expense) and income taxes have been added or deducted.

Net Profit Margin Ratio

$$\frac{\text{Net income}}{\text{Net sales}}$$

1) EXAMPLE:

	Dollars	Percent	
Net sales	$1,800,000	100.0%	
Cost of goods sold	(1,450,000)	(80.6%)	
Gross margin	**$ 350,000**	**19.4%**	
SG&A expenses	(160,000)	(8.9%)	
Operating income	**$ 190,000**	**10.6%**	
Other income and loss	(40,000)	(2.2%)	
EBIT	$ 150,000	8.3%	
Interest expense	(15,000)	(0.8%)	
Earnings before taxes	$ 135,000	7.5%	
Income taxes (40%)	(54,000)	(3.0%)	
Net income	**$ 81,000**	**4.5%**	**(Net profit margin)**

2) The numerator may also be stated in terms of the net income available to common shareholders.

3) Another form of the ratio excludes nonrecurring items from the numerator, e.g., unusual or infrequent items, discontinued operations, extraordinary items, and effects of accounting changes. The result is sometimes called the net profit margin. This adjustment may be made for any ratio that includes net income.

a) Still other numerator refinements are to exclude equity-based earnings and items in the other income and other expense categories.

d. **Earnings before interest, taxes, depreciation, and amortization (EBITDA)** is a commonly used performance measure that approximates cash-basis profits from ongoing operations.

1) EBITDA is arrived at by adding back the two major noncash expenses to EBIT.

2) EBITDA is a controversial measure that is only used for companies that look bad under other ratios. Basically, it shows how a company is performing if fixed costs are ignored.

EBITDA Margin

$$\frac{\text{EBITDA}}{\text{Net sales}}$$

2. **Profitability Ratios**

   a. Return on assets, or ROA (also called return on total assets, or ROTA), is a straightforward measure of how well management is deploying the firm's assets in the pursuit of a profit.

Return on Assets (ROA)

$$\frac{\text{Net income}}{\text{Average total assets}}$$

   1) EXAMPLE: ROA = Net income ÷ Average total assets
   = $81,000 ÷ [($1,800,000 + $1,600,000) ÷ 2]
   = $81,000 ÷ $1,700,000
   = 4.76%

   b. Return on equity (ROE) measures the return per owner dollar invested.

Return on Equity (ROE)

$$\frac{\text{Net income}}{\text{Average total equity}}$$

   1) EXAMPLE: ROE = Net income ÷ Average total equity
   = $81,000 ÷ [($800,000 + $650,000) ÷ 2]
   = $81,000 ÷ $725,000
   = 11.17%

   2) The relationship between the return on equity and the return on assets can be seen by the following formula:

$$\text{ROA} = \text{ROE} \times (1 - \text{Debt ratio})$$

   c. The sustainable growth rate equals the return on equity times the difference of 1 and the dividend payout ratio.

Sustainable Growth Rate

$$\text{ROE} \times (1 - \text{Dividend payout ratio})$$

   1) This ratio measures the potential growth of a firm without borrowing additional funds.

   2) The retention ratio, or the difference of 1 and the dividend payout ratio, is the portion of the income kept to grow the firm.

   d. The difference in the two denominators is total liabilities. ROE will therefore always be greater than ROA.

3. **The DuPont Model -- ROA**

   a. The DuPont model begins with the standard equation for return on assets (ROA) and breaks it down into two component ratios, one that focuses on the income statement and one that relates income to the balance sheet.

DuPont Model for Return on Assets

$$\frac{\text{Net income}}{\text{Average total assets}} = \frac{\text{Net income}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Average total assets}}$$

$$= \text{Net profit margin} \times \text{Total asset turnover}$$

      1) EXAMPLE:

ROA = Net profit margin × Total asset turnover
= (Net income ÷ Net sales) × (Net sales ÷ Average total assets)
= ($81,000 ÷ $1,800,000) × {$1,800,000 ÷ [($1,800,000 + $1,600,000) ÷ 2]}
= 4.5% × 1.06
= 4.77%

      2) This breakdown emphasizes that shareholder return may be explained in terms of both profit margin and the efficiency of asset management.

   b. The two components of the DuPont equation are interrelated because they both involve net sales.

      1) Profit margin on sales is another name for the net profit margin calculated in the DuPont model.

         a) If net sales increase and all other factors remain the same, the net profit margin worsens because more sales are only generating the same bottom line.

      2) Total asset turnover measures the level of capital investment relative to sales volume.

         a) If net sales increase and all other factors remain the same, the asset turnover ratio improves because more sales are being produced by the same amount of assets.

4. **The DuPont Model -- ROE**

   a. To examine the **return on equity (ROE) ratio**, it can be subdivided by the DuPont model into three different efficiency components.

DuPont Model for Return on Equity

$$\frac{\text{Net income}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Average total assets}} \times \frac{\text{Average total assets}}{\text{Average total equity}}$$

$$\text{Net profit margin} \times \text{Assets turnover} \times \text{Equity multiplier}$$

EXAMPLE 7-1 ROE

$$\text{ROE} = \frac{\$81{,}000}{\$1{,}800{,}000} \times \frac{\$1{,}800{,}000}{[(\$1{,}800{,}000 + \$1{,}600{,}000) \div 2]} \times \frac{[(\$1{,}800{,}000 + \$1{,}600{,}000) \div 2]}{[(\$800{,}000 + \$650{,}000) \div 2]}$$

$$= 0.045 \times 1.06 \times 2.345$$

$$= 11.19\%$$

- The net profit margin component examines a company's efficiency in generating earnings from sales. It measures the amount of earnings that the company makes from every $1 of sales.
- The assets turnover component examines how efficiently the company is deploying the totality of its resources to generate revenues. It measures how much sales a company generates from each $1 of assets.
- The equity multiplier measures a company's financial leverage. High financial leverage means that the company relies more on debt to finance its assets. So, on the one hand, by raising capital with debt, the company can increase its equity multiplier and improve its return on equity. But, on the other hand, taking on additional debt may worsen the company's solvency and increase the risk of going bankrupt.

5. **Inconsistent Definitions**

   a. Under various return ratios, the numerator ("return") may be adjusted by

      1) Subtracting preferred dividends to leave only income available to common stockholders
      2) Adding back minority interest in the income of a consolidated subsidiary (when invested capital is defined to include the minority interest)
      3) Adding back interest expense
      4) Adding back both interest expense and taxes so that the numerator is EBIT; this results in the basic earning power ratio, which enhances comparability of firms with different capital structures and tax planning strategies

   b. The denominator ("equity" or "assets") may be adjusted by

      1) Excluding nonoperating assets, such as investments, intangible assets, and the other asset category
      2) Excluding unproductive assets, such as idle plant, intangible assets, and obsolete inventories
      3) Excluding current liabilities to emphasize long-term capital
      4) Excluding debt and preferred stock to arrive at equity capital
      5) Stating invested capital at market value

7.5 PROFITABILITY RATIOS -- EFFECTS OF TRANSACTIONS

Some of the questions pertaining to profitability ratios that a candidate will encounter on the CMA exam focus on the effects typical business transactions have on a firm's profitability rather than on the mechanics of calculating the ratios. This subunit consists entirely of such questions. Please review Subunit 7.4 before attempting to answer the questions in this subunit.

7.6 FACTORS AFFECTING REPORTED PROFITABILITY

1. **Factors Involved**
    a. Among the many factors involved in measuring profitability are the definition of income; the stability, sources, and trends of revenue; revenue relationships; and expenses, including cost of sales.
        1) This analysis attempts to answer questions about the relevant income measure, income quality, the persistence of income, and the firm's earning power.
2. **Income**
    a. Estimates are necessary to calculate income, for example, allocations of revenue and expense over accounting periods, useful lives of assets, and amounts of future liabilities.
    b. Income is measured in accordance with a selection from among generally accepted accounting principles. For example, selecting between the accrual basis and cash basis of accounting.
        1) Accrual accounting records the financial effects of transactions and other events and circumstances when they occur rather than when their associated cash is paid or received.
        2) Under the cash basis, revenues are recognized when cash is received and expenses are recognized when cash is paid.
    c. Incentives for disclosure about the income measure vary with the interest group: financial analysts, auditors, accountants, management, directors, shareholders, competitors, creditors, and regulators.
        1) The pressures from some groups may lead to suboptimal financial reporting.
    d. Users have different needs, but financial statements are general purpose.
        1) For example, investors are interested in profitability, but creditors are interested in security.
3. **Revenues**
    a. Revenues are inflows or other enhancements of assets of the firm or settlements of its liabilities from delivering or producing goods, rendering services, or other activities that constitute the firm's ongoing major or central operations.
    b. Understanding the sources of revenue is especially important in diversified firms.
        1) Common-size analysis is useful when markets and product lines have differing rates of growth, potential, and profitability.
    c. Trend percentage analysis and evaluation of management's discussion and analysis (MD&A) in the firm's annual report are useful techniques for assessing the persistence of the firm's revenues.

4. **Recognition Principles**

   a. Recognition of revenues, expenses, gains, losses, and changes in related assets and liabilities involves, among other things, the application of pervasive expense recognition principles: associating cause and effect, systematic and rational allocation, and immediate recognition.

      1) The FASB's Conceptual Framework defines matching, a term that has been given a variety of meanings in accounting literature, as essentially synonymous with associating cause and effect.

      2) Matching "is simultaneous or combined recognition of the revenues and expenses that result directly and jointly from the same transactions or other events." Such a direct relationship is found when revenue for sales of goods is recognized in the same period as the cost of the goods sold.

   b. Revenue is recognized when (1) realized or realizable and (2) earned.

      1) Revenues are **realized** when goods or services have been exchanged for cash or claims to cash.

         a) For example, revenues are realized when inventory is exchanged for cash.

         b) Revenues are also realized when inventory is exchanged for claims to cash, which is recorded as a receivable by the party holding the claims.

      2) Revenues are **realizable** when goods or services have been exchanged for assets that are readily convertible into cash or claims to cash.

      3) Revenues are **earned** when the earning process has been substantially completed and the entity is entitled to the resulting benefits or revenues.

      4) The two conditions are usually met when goods are delivered or services are rendered, that is, at the time of sale, which is customarily the time of delivery.

   c. Below is the **five-step model** for recognizing revenue from contracts with customers.

Step 1:	Identify the contract(s) with a customer.
Step 2:	Identify the performance obligations in the contract.
Step 3:	Determine the transaction price.
Step 4:	Allocate the transaction price to the performance obligations in the contract.
Step 5:	Recognize revenue when (or as) a performance obligation is satisfied.

      1) The **core principle** is that an entity recognizes revenue for the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in the exchange.

d. Immediate recognition is the applicable principle when costs cannot be directly or feasibly related to specific revenues and their benefits are used up in the period in which they are incurred. Utilities expense is a common example.

e. As a reflection of the accounting profession's conservatism, expenses and losses have historically been subject to less stringent recognition criteria than revenues and gains.

1) Expenses and losses are not subject to the realization criterion.

2) Rather, expenses and losses are recognized when a consumption of economic benefits occurs during the entity's primary activities or when the ability of existing assets to provide future benefits has been impaired.

a) An expense or loss may also be recognized when a liability has been incurred or increased without the receipt of corresponding benefits; a probable and reasonably estimable contingent loss is an example.

3) Long-lived assets, such as equipment, buildings, and intangibles, are depreciated or amortized over their useful lives. Natural resources are depleted, usually on a units-of-production basis.

f. Systematic and rational allocation procedures do not directly relate costs and revenues but are applied when a causal relationship is "generally, but not specifically, identified."

1) This expense recognition principle is appropriate when (a) an asset provides benefits over several periods (its estimated useful life), (b) the asset is used up as a result of events affecting the entity, and (c) the expense resulting from such wastage is indirectly (not directly and traceably) related to specific revenues and particular periods.

2) The usual example is depreciation.

5. **Cost of Goods Sold and Gross Profit**

a. Cost of goods sold is the single largest cost element for any seller of merchandise and thus has the greatest impact on profitability. A company's gross profit margin is the percentage of its gross sales that it is able to keep after paying for merchandise.

1) EXAMPLE:

	Current Year		Prior Year	
Gross sales	**$1,827,000**	**100.0%**	**$1,418,000**	**100.0%**
Sales discounts	(15,000)	(0.8%)	(10,000)	(0.7%)
Sales return and allowances	(12,000)	(0.7%)	(8,000)	(0.6%)
Net sales	**$1,800,000**	**98.5%**	**$1,400,000**	**98.7%**
Cost of goods sold	(1,450,000)	(79.4%)	(1,170,000)	(82.5%)
Gross profit	**$ 350,000**	**19.1%**	**$ 230,000**	**16.2%**

b. A change in the gross profit margin can indicate that the firm has priced its products differently while maintaining the same cost structure or that it has changed the way it controls the costs of production and/or inventory management.

6. **Major Categories of Expenses for a Company**

   a. Selling expenses are incurred in selling or marketing. Examples include sales representatives' salaries, rent for sales department, commissions, and traveling expenses; advertising; selling department salaries and expenses; samples; and credit and collection costs, including bad debt expenses. Shipping (i.e., freight-out) costs are also often classified as selling costs.

   b. General and administrative expenses are incurred for the direction of the enterprise as a whole and are not related wholly to a specific function, e.g., selling or manufacturing. They include accounting, legal, and other fees for services; officers' salaries; insurance; wages of office staff; miscellaneous supplies; and office occupancy costs.

   c. Depreciation is the allocation of the costs of equipment that benefit subsequent periods. Usually, the cost of a fixed asset minus salvage or residual value is expensed over the asset's useful life. Because of the noncash nature and relatively fixed amount of depreciation, it is not extremely meaningful except in relation to depreciable assets. This ratio may detect changes in the composite rate.

      1) Depreciation on equipment used in the production of merchandise for sale is considered a product cost and is thus included in cost of goods sold, not administrative expenses.

   d. Maintenance and repairs expense varies with the amount of plant and equipment and the extent of output. It also has fixed and variable components and does not vary directly with revenues. Moreover, this expense is discretionary and is therefore a means of smoothing income. Thus, it relates to earnings quality.

      1) Maintenance is also a factor in estimating assets' useful lives and the calculation of depreciation.

   e. Interest expense is recognized based on the passage of time. In the case of bonds, notes, and finance leases, the effective interest method is used. A typical analytical tool is the calculation of the trend of the average effective interest rate for the firm and comparison with the rates for other firms. It is generally reported on the income statement under other expenses and losses.

   f. Amortization of special costs such as those of intangible assets is usefully analyzed by comparison of trends with respect to revenues, unamortized special costs, and net property and equipment.

   g. Income tax expense is an important item in financial statements because of its magnitude.

      1) Accrual accounting for income taxes is characterized by interperiod tax allocation that matches tax expense with accrual income. The analysis must be aware of both temporary and permanent tax differences between accrual accounting and tax law.

      2) Intraperiod tax allocation allocates tax to the components of income (continuing operations, discontinued operations, extraordinary items, other comprehensive income, and items debited or credited directly to equity). The analysis should extend to comparisons of effective tax rates (expense ÷ pre-tax income) over time.

7. Trends in Expenses

a. Analyzing trends in expenses is facilitated by the use of percentages, i.e., a detailed analysis of the expense line items found on the common-size income statements.

EXAMPLE 7-2 Common-Size Expense Analysis

	Current Year		Prior Year	
Net sales	**$1,800,000**	**100.0%**	**$1,400,000**	**100.0%**
Selling expenses:				
Sales salaries and commissions	$ 12,000	0.67%	$ 1,000	0.07%
Freight-out	16,000	0.89%	5,000	0.36%
Travel	10,000	0.56%	5,000	0.36%
Advertising	8,000	0.44%	3,000	0.21%
Office supplies	4,000	0.22%	1,000	0.07%
Total selling expenses	**$ 50,000**	**2.78%**	**$ 15,000**	**1.07%**
Administrative expenses:				
Executive salaries	$ 6,000	0.33%	$ 4,000	0.29%
Professional salaries	4,000	0.22%	4,000	0.29%
Wages	2,000	0.11%	1,000	0.07%
Depreciation	1,000	0.06%	500	0.04%
Office supplies	2,000	0.11%	500	0.04%
Total administrative expenses	**$ 15,000**	**0.83%**	**$ 10,000**	**0.73%**
Total operating expenses	**$ 65,000**	**3.61%**	**$ 25,000**	**1.80%**

The company's operating expenses increased overall; this would be expected during a period of rising sales. However, not every expense line item increased proportionally. The company devoted much more effort to moving product out the door by increasing the proportion of sales salaries and commissions and freight-out.

Also note that, while professional salaries were the same absolute amount in both years, they were a smaller proportion of all administrative expenses in the current year because of the greater amount spent overall.

8. Effects of Accounting Changes

a. The types of accounting changes are changes in (1) accounting principle, (2) accounting estimates, and (3) the reporting entity. Accounting changes and error corrections affect financial ratios.

b. A **change in accounting principle** occurs when an entity (1) adopts a generally accepted principle different from the one previously used, (2) changes the **method** of applying a generally accepted principle, or (3) changes to a generally accepted principle when the principle previously used is no longer generally accepted.

1) **Retrospective application**, if practicable, is required for all direct effects and the related income tax effects of a change in principle.

a) An example of a direct effect is an adjustment of an inventory balance to implement a change in the method of measurement.

2) Retrospective application requires that carrying amounts of (a) assets, (b) liabilities, and (c) retained earnings at the beginning of the first period reported be adjusted for the cumulative effect of the new principle on all periods not reported.

a) All periods reported must be individually adjusted for the period-specific effects of applying the new principle.

c. A **change in accounting estimate** results from new information and a reassessment of the future benefits and obligations represented by assets and liabilities. Its effects should be accounted for only in the period of change and any future periods affected, i.e., **prospective application** should be used.

   1) A change in estimate inseparable from (effected by) a change in principle is accounted for as a change in estimate. An example is a change in a method of depreciation, amortization, or depletion of long-lived, nonfinancial assets.

d. A change in reporting entity is retrospectively applied to interim and annual statements.

   1) A change in reporting entity does not result from a business combination or consolidation of a variable interest entity.

e. An **accounting error** results from (1) a mathematical mistake, (2) a mistake in the application of GAAP, or (3) an oversight or misuse of facts existing when the statements were prepared. A change to a generally accepted accounting principle from one that is not is an error correction, not an accounting change.

   1) An accounting error related to a prior period is reported as a prior-period adjustment by restating the prior-period statements. Restatement requires the same adjustments as retrospective application of a new principle.

   2) Error corrections related to prior periods result in restatement.

      a) After retrospective application or restatement, the comparative financial statements and ratios should be comparable and consistent.

      b) However, changing prior years' net income and related EPS figures may undermine shareholders' confidence in the accounting methods.

7.7 SOLVENCY

1. Elements of Solvency

a. Solvency is a firm's ability to pay its **noncurrent obligations** as they come due and thus remain in business in the long run (contrast with liquidity).

   1) The key ingredients of solvency are the firm's capital structure and degree of leverage.

b. A firm's capital structure includes its sources of financing, both long- and short-term. These sources can be in the form of debt (external sources) or equity (internal sources).

   1) Capital structure decisions affect the **risk profile** of a firm. For example, a company with a higher percent of debt capital will be riskier than a firm with a high percentage of equity capital. Thus, when there is a lot of debt, equity investors will demand a higher rate of return on their investments to compensate for the risk brought about by the high use of financial leverage.

   2) Alternatively, a company with a high level of equity capital will be able to borrow at lower rates because debt holders will accept lower interest in exchange for the lower risk indicated by the equity cushion.

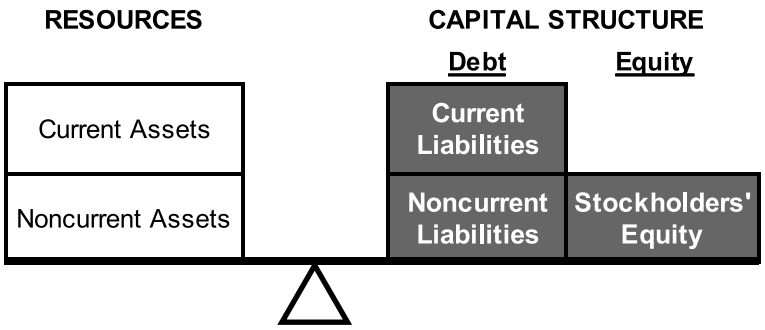


Figure 7-2

c. Debt is the creditor interest in the firm.

   1) The firm is contractually obligated to repay debtholders. The terms of repayment (i.e., timing of interest and principal) are specified in the debt agreement.

   2) As long as the return on debt exceeds the amount of interest paid, the use of debt financing is advantageous to a firm. This is because interest payments on debt are tax-deductible.

   3) The tradeoff is that an increased debt load makes a firm riskier (since debt must be paid regardless of whether the company is profitable). At some point, either a firm will have to pay a higher interest rate than its return on debt or creditors will simply refuse to lend any more money.

d. Equity is the ownership interest in the firm.

   1) Equity is the permanent capital of an enterprise, contributed by the firm's owners in the hopes of earning a return.

   2) However, a return on equity is uncertain because equity embodies only a residual interest in the firm's assets (residual because it is the claim left over after all debt has been satisfied).

   3) Periodic returns to owners of excess earnings are referred to as dividends. The firm may be contractually obligated to pay dividends to preferred stockholders but not to common stockholders.

e. **Capital adequacy** is a term normally used in connection with financial institutions. A bank must be able to pay those depositors that demand their money on a given day and still be able to make new loans.

   1) Capital adequacy can be discussed in terms of solvency (the ability to pay long-term obligations as they mature), liquidity (the ability to pay for day-to-day ongoing operations), reserves (the specific amount a bank must have on hand to pay depositors), or sufficient capital.

2. **Capital Structure Ratios**

   a. These ratios report the relative proportions of debt and equity in a firm's capital structure at a given reporting date.

   b. The total debt to total capital ratio measures the percentage of the firm's capital structure provided by creditors.

Total Debt to Total Capital Ratio

$$\frac{\text{Total debt}}{\text{Total capital}}$$

1) EXAMPLE: Current Year: $1,000,000 ÷ $1,800,000 = 0.556
   Prior Year: $ 950,000 ÷ $1,600,000 = 0.594

   a) The company became slightly less reliant on debt in its capital structure during the current year. Although total debt rose, equity rose by a greater percentage. The company is thus less leveraged than before.

2) When total debt to total capital is low, it means more of the firm's capital is supplied by the stockholders. Thus, creditors prefer this ratio to be low as a cushion against losses.

   c. The debt to equity ratio is a direct comparison of the firm's debt load versus its equity stake.

Debt to Equity Ratio

$$\frac{\text{Total debt}}{\text{Stockholders' equity}}$$

1) EXAMPLE: Current Year: $1,000,000 ÷ $800,000 = 1.25
   Prior Year: $ 950,000 ÷ $650,000 = 1.46

   a) The amount by which the company's debts exceed its equity stake declined in the current year.

2) Like the previous ratio, the debt to equity ratio reflects long-term debt-payment ability. Again, a low ratio means a lower relative debt burden and thus better chances of repayment of creditors.

   d. The long-term debt to equity ratio reports the long-term debt burden carried by a company per dollar of equity.

Long-Term Debt to Equity Ratio

$$\frac{\text{Long-term debt}}{\text{Stockholders' equity}}$$

1) EXAMPLE: Current Year: $610,000 ÷ $800,000 = 0.763
   Prior Year: $675,000 ÷ $650,000 = 1.038

   a) The company has greatly improved its long-term debt burden. It now carries less than one dollar of long-term debt for every dollar of equity.

   b) A low ratio means a firm will have an easier time raising new debt (since its low current debt load makes it a good credit risk).

e. The debt to total assets ratio (also called the debt ratio) reports the total debt burden carried by a company per dollar of assets.

Debt to Total Assets Ratio

$$\frac{\text{Total liabilities}}{\text{Total assets}}$$

1) EXAMPLE: Current Year: $1,000,000 ÷ $1,800,000 = 0.556
Prior Year: $ 950,000 ÷ $1,600,000 = 0.594

a) Although total liabilities increased in absolute terms, this ratio improved because total assets increased even more.

2) Numerically, this ratio is identical to the debt to total capital ratio.

3. **Earnings Coverage**

a. These ratios are a creditor's best measure of a firm's ongoing ability to generate the earnings that will allow it to service debt out of current earnings.

b. The times interest earned ratio is an income statement approach to evaluating a firm's ongoing ability to meet the interest payments on its debt obligations.

Times Interest Earned Ratio

$$\frac{\text{EBIT}}{\text{Interest expense}}$$

1) EXAMPLE: Current Year: $150,000 ÷ $15,000 = 10.00 times
Prior Year: $125,000 ÷ $10,000 = 12.50 times

a) The company is less able to comfortably pay interest expense. In the prior year, EBIT was twelve and a half times interest expense, but in the current year, it is only ten times.

2) For the ratio to be meaningful, net income cannot be used in the numerator. Since what is being measured is the ability to pay interest, earnings before interest and taxes is appropriate.

3) The most accurate calculation of the numerator includes only earnings expected to recur. Consequently, unusual or infrequent items, extraordinary items, discontinued operations, and the effects of accounting changes should be excluded.

4) The denominator should include capitalized interest.

c. The earnings to fixed charges ratio (also called the fixed charge coverage ratio) extends the times interest earned ratio to include the interest portion associated with long-term lease obligations.

Earnings to Fixed Charges Ratio

$$\frac{\text{Earnings before fixed charges and taxes}}{\text{Fixed charges}}$$

NOTE: Fixed charges include interest, required principal repayments, and leases.

1) This is a more conservative ratio since it measures the coverage of earnings over all fixed charges, not just interest expense.

d. The cash flow to fixed charges ratio removes the difficulties of comparing amounts prepared on an accrual basis.

$$\textbf{Cash Flow to Fixed Charges Ratio} = \frac{\text{(Cash from operations + Fixed charges + Tax payments)}}{\text{Fixed charges}}$$

NOTE: Cash from operations is after-tax.

7.8 LEVERAGE

For the purpose of the CMA exam, be sure that you understand and can calculate both leverage ratios. However, calculating these ratios is just one aspect of how you could be tested on this topic. Candidates should be fully prepared to apply these calculations and demonstrate an understanding through multiple-choice or essay questions of how changes in cost structure may affect these ratios. Ensure that you understand what risks and advantages are associated with high operating or financial leverage.

1. Types of Leverage

a. Leverage is the relative amount of fixed cost in a firm's overall cost structure. Leverage creates risk because fixed costs must be covered, regardless of the level of sales.

1) **Operating leverage** arises from the use of a high level of plant and machinery in the production process, revealed through charges for depreciation, property taxes, etc.

2) **Financial leverage** arises from the use of a high level of debt in the firm's financing structure, revealed through amounts paid out for interest.

b. Thus, although leverage arises from items on the balance sheet, it is measured by examining its effects on the income statement. A general statement of leverage is

$$\text{Degree of leverage} = \frac{\text{Pre-fixed-cost income amount}}{\text{Post-fixed-cost income amount}}$$

2. **Degree of Operating Leverage (DOL)**

   a. Calculation of the DOL requires financial information prepared on the variable-costing basis, since variable costing isolates the use of fixed costs in the firm's ongoing operations.

Degree of Operating Leverage (DOL) -- Single-Period Version

$$\frac{\text{Contribution margin}}{\text{Operating income or EBIT}}$$

   b. A firm's DOL varies with the level of sales, as shown in the following example:

      1) EXAMPLE:

Degree of Operating Leverage at Various Levels of Sales

Sales volume:	**100 Units**	**250 Units**	**500 Units**	**750 Units**	**1,000 Units**
Net sales ($1,000 per unit)	$ 100,000	$ 250,000	$ 500,000	$ 750,000	$1,000,000
Variable costs ($800 per unit)	(80,000)	(200,000)	(400,000)	(600,000)	(800,000)
Contribution margin	$ 20,000	$ 50,000	$ 100,000	$ 150,000	$ 200,000
Fixed costs	(100,000)	(100,000)	(100,000)	(100,000)	(100,000)
Operating income (loss)	$ (80,000)	$ (50,000)	$ 0	$ 50,000	$ 100,000
Degree of operating leverage (DOL)	**(0.25)**	**(1.00)**	**Undef.**	**3.00**	**2.00**

      2) This firm breaks even at sales of 500 units.

      3) As the example demonstrates, DOL is not a meaningful measure when the firm incurs an operating loss.

   c. Two versions of DOL are in common use.

      1) The version shown above compares contribution margin and variable-basis operating income in a single reporting period.

      2) The percentage-change version of DOL measures the changes in income statement amounts from one period to another.

Degree of Operating Leverage (DOL) -- Percentage-Change Version

$$\frac{\%\Delta \text{ in operating income or EBIT}}{\%\Delta \text{ in sales}}$$

         a) The percentage-change version is necessary when the only financial reports available are those prepared on the absorption basis.

         b) Note that, in this version, the numerator and denominator are different from those in the single-period version.

3) EXAMPLE:

Degree of Operating Leverage
Period-to-Period Percentage Change

	Current Year	Prior Year
Net sales	**$1,800,000**	**$1,400,000**
Cost of goods sold	(1,450,000)	(1,170,000)
Gross margin	$ 350,000	$ 230,000
SG&A expenses	(160,000)	(80,000)
Operating income	$ 190,000	$ 150,000
Other income and loss	(40,000)	(25,000)
EBIT	**$ 150,000**	**$ 125,000**
Interest expense	(15,000)	(10,000)
Earnings before taxes	$ 135,000	$ 115,000
Income taxes (40%)	(54,000)	(46,000)
Net income	$ 81,000	$ 69,000

Numerator: %Δ in EBIT = ($150,000 – $125,000) ÷ $125,000 = 20.00%
Denominator: %Δ in sales = ($1,800,000 – $1,400,000) ÷ $1,400,000 = 28.57%

Degree of operating leverage (DOL) = 20.00% ÷ 28.57% = 0.7

a) Every 1% change in sales generates a 0.7% change in EBIT.

d. A firm with high operating leverage necessarily carries a greater degree of risk because fixed costs must be covered regardless of the level of sales.

1) However, such a firm is also able to expand production rapidly in times of higher product demand. Thus, the more leveraged a firm is in its operations, the more sensitive operating income is to changes in sales volume.

3. **Degree of Financial Leverage (DFL)**

a. The DFL also results from a pre-fixed-cost income to post-fixed-cost income comparison, this time on the firm's financing structure.

Degree of Financial Leverage (DFL) -- Single-Period Version

$$\frac{\text{Earnings before interest and taxes (EBIT)}}{\text{Earnings before taxes (EBT)}}$$

1) This formula isolates the effects of interest as the only truly fixed financing cost.

2) EXAMPLE:

Degree of Financial Leverage
Single-Period Version

	Current Year	Prior Year
Net sales	$1,800,000	$1,400,000
Cost of goods sold	(1,450,000)	(1,170,000)
Gross margin	$ 350,000	$ 230,000
SG&A expenses	(160,000)	(80,000)
Operating income	$ 190,000	$ 150,000
Other income and loss	(40,000)	(25,000)
EBIT	**$ 150,000**	**$ 125,000**
Interest expense	(15,000)	(10,000)
Earnings before taxes	**$ 135,000**	**$ 115,000**
Income taxes (40%)	(54,000)	(46,000)
Net income	$ 81,000	$ 69,000

Degree of financial leverage

Current year: $150,000 ÷ $135,000 = $1.11
Prior year: $125,000 ÷ $115,000 = $1.09

The company needs $1.11 of EBIT to generate $1.00 of EBT. Last year, only $1.09 of EBIT was needed to generate $1.00 of EBT.

b. Two versions of DFL are in common use.

1) The version shown on the previous page and above compares EBIT and EBT from a single reporting period.

2) The percentage-change version examines the changes in income statement amounts over two periods.

Degree of Financial Leverage (DFL) -- Percentage-Change Version

$$\frac{\%\Delta \text{ in net income}}{\%\Delta \text{ in EBIT}}$$

a) Note that in the percentage-change version, the numerator and denominator are different from those in the single-period version.

3) EXAMPLE:

Numerator: %Δ in net income = ($81,000 – $69,000) ÷ $69,000 = 17.39%
Denominator: %Δ in EBIT = ($150,000 – $125,000) ÷ $125,000 = 20.00%

Degree of financial leverage (DFL) = 17.39% ÷ 20.00% = 0.8696

a) Every 1% change in EBIT generates a 0.87% change in net income.

c. A firm with high financial leverage necessarily carries a greater degree of risk because debt must be serviced regardless of the level of earnings.

1) However, if such a firm is profitable, there is more residual profit for the shareholders after debt service (interest on debt is tax-deductible), reflected in higher earnings per share. Furthermore, debt financing permits the current equity holders to retain control.

7.9 COMMON-SIZE FINANCIAL STATEMENTS

1. Percentages and Comparability

a. Analyzing the financial statements of steadily growing firms and firms of different sizes within an industry presents certain difficulties.

1) To overcome this obstacle, common-size statements restate financial statement line items in terms of a percentage of a given amount, such as total assets for a balance sheet or net sales for an income statement.

b. Items on common-size financial statements are expressed as percentages of sales (on the income statement) or total assets (on the balance sheet). The base amount is assigned the value of 100%.

1) Thus, on an income statement, sales is valued at 100%, while all other amounts are a percentage of sales. On the balance sheet, total assets are 100%, as is the total of liabilities and stockholders' equity. Each line item can be interpreted in terms of its proportion of the baseline figure.

c. EXAMPLES:

Income statement
External reporting format

	Current Year	Prior Year
Net sales	$1,800,000	$1,400,000
Cost of goods sold	(1,650,000)	(1,330,000)
Gross profit	150,000	70,000
Selling expenses	(50,000)	(15,000)
General and admin. expenses	(15,000)	(10,000)
Operating income	85,000	45,000
Other revenues and gains	20,000	0
Other expenses and losses	(35,000)	(10,000)
Income before taxes	70,000	35,000
Income taxes (40%)	(28,000)	(14,000)
Net income	$ 42,000	$ 21,000

Income statement
Common-size format

	Current Year	Prior Year
Net sales	100.0%	100.0%
Cost of goods sold	(91.7%)	(95.0%)
Gross profit	8.3%	5.0%
Selling expenses	(2.8%)	(1.1%)
General and admin. expenses	(0.8%)	(0.7%)
Operating income	4.7%	3.2%
Other revenues and gains	1.1%	0.0%
Other expenses and losses	(1.9%)	(0.7%)
Income before taxes	3.9%	2.5%
Income taxes (40%)	(1.6%)	(1.0%)
Net income	2.3%	1.5%

Balance sheet
External reporting format

Assets:	Current Year End	Prior Year End
Current assets	$ 760,000	$ 635,000
Noncurrent assets	1,040,000	965,000
Total assets	$1,800,000	$1,600,000
Liabilities and stockholders' equity:		
Current liabilities	$ 390,000	$ 275,000
Noncurrent liabilities	610,000	675,000
Total liabilities	$1,000,000	$ 950,000
Stockholders' equity	800,000	650,000
Total liabilities and stockholders' equity	$1,800,000	$1,600,000

Balance sheet
Common-size format

Assets:	Current Year End	Prior Year End
Current assets	42.2%	39.7%
Noncurrent assets	57.8%	60.3%
Total assets	100.0%	100.0%
Liabilities and stockholders' equity:		
Current liabilities	21.7%	17.2%
Noncurrent liabilities	33.9%	42.2%
Total liabilities	55.6%	59.4%
Stockholders' equity	44.4%	40.6%
Total liabilities and stockholders' equity	100.0%	100.0%

d. Preparing common-size statements makes it easier to analyze differences among companies of various sizes or comparisons between a similar company and an industry average.

1) For example, comparing the efficiency of a company with $1,800,000 of revenues to a company with $44 billion in revenues is difficult unless the numbers are reduced to a common denominator.

2. **Vertical and Horizontal Analysis**

a. The common-size statements on the previous page are an example of vertical analysis (i.e., the percentages are based on numbers above or below in the same column).

1) Another concept is horizontal analysis. It states the amounts for several periods as percentages of a base-year amount. These are often called trend percentages.

b. One period is designated the base period, to which the other periods are compared. Each line item of the base period is thus 100%.

EXAMPLE 7-3 Horizontal Analysis

Income statement
External reporting format

	Current Year	Prior Year	2nd Prior Year
Net sales	$1,800,000	$1,400,000	$1,500,000
Cost of goods sold	(1,650,000)	(1,330,000)	(1,390,000)
Gross profit	**$ 150,000**	**$ 70,000**	**$ 110,000**

Income statement
Trend analysis

	Current Year	Prior Year	2nd Prior Year
Net sales	120.0%	93.3%	100.0%
Cost of goods sold	118.7%	95.7%	100.0%
Gross profit	**136.4%**	**63.6%**	**100.0%**

Even though sales and cost of goods sold declined only slightly from the base year to the next year, gross profit plunged (on a percentage basis). By the same token, when sales recovered in the current year, the gain in gross profit was (proportionally) greater than the increases in its two components.

c. There is also a form of horizontal analysis that does not use common sizes. This method is used to calculate the growth (or decline) of key financial line items.

1) For example, if a company's sales increased from $100,000 to $120,000, there would be a third column showing the percentage increase, which was 20% in this case.

2) This is another form of management by exception. Managers can look at the third column (the percentage change column) and see which accounts have experienced the most change since the previous period.

7.10 OFF-BALANCE-SHEET FINANCING

1. **Purposes**
    a. Reducing a company's debt load improves its ratios, making its securities more attractive investments. Also, many loan covenants contain restrictions on the total debt load that a company is permitted to carry.
        1) However, reducing debt and hiding it are two very different things. Firms that carry extensive debt financing but attempt to disguise the fact are engaging in off-balance-sheet financing.
        2) Eliminating debt from the balance sheet through off-balance-sheet financing will improve a company's debt to equity ratio because there will be less debt reported.
2. **Investments in Unconsolidated Subsidiaries**
    a. Investments in unconsolidated subsidiaries can reduce debt on the balance sheet.
    b. Any equity ownership of less than 50% in a subsidiary results in the parent firm reporting the equity investment as an asset.
    c. The result is that the subsidiary's debts, for which the parent could be substantially responsible, are not reflected as liabilities of the parent.
    d. Establishing a **joint venture** will accomplish the same purpose as an unconsolidated subsidiary because joint ventures are usually accounted for on the equity basis since none of the ventures are typically considered to hold control.
3. **Special Purpose Entities**
    a. A firm may create another firm for the sole purpose of keeping the liabilities associated with a specific project off the parent firm's books.
    b. For example, when a company wishes to construct a factory, large amounts of new debt must be taken on. A special purpose entity (SPE) can be established solely to build and operate the new plant while absorbing the debt incurred during construction.
    c. In late 2001, the national media revealed that Enron Corporation had hidden a huge amount of debt for which it was responsible by "off-loading" it onto the balance sheets of SPEs. These SPEs had been deliberately structured so that Enron would not have to consolidate them.
        1) In 2003, the FASB responded to these abuses by issuing pronouncements on variable interest entities (VIEs). Any arrangement that meets the criteria of a VIE must be reported on a consolidated basis with another entity.
4. **Factoring Receivables with Recourse**
    a. Factoring (selling) accounts receivable to a finance company is a strategy used by firms that need to accelerate their cash flows or that simply do not wish to maintain a collection operation.
        1) If the factoring transaction is "with recourse," the firm remains contingently liable to the finance company in the case of debtor default. This contingent liability does not have to be reported on the company's balance sheet.

STUDY UNIT EIGHT

ACTIVITY MEASURES AND FINANCING

This study unit is the **second of two** on **financial statement analysis**. The relative weight assigned to this major topic in Part 2 of the exam is **20%**. The two study units are

Study Unit 7: Ratio Analysis
Study Unit 8: Activity Measures and Financing

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

8.1 ACTIVITY MEASURES

1. Income Statement to Balance Sheet

a. Activity ratios measure how quickly the two major noncash assets are converted to cash.

1) Activity ratios measure results over a period of time and thus draw information from the firm's income statement as well as from the balance sheet.

EXAMPLE 8-1 Balance Sheet

RESOURCES			FINANCING		
CURRENT ASSETS:	**Current Year End**	**Prior Year End**	**CURRENT LIABILITIES:**	**Current Year End**	**Prior Year End**
Cash and equivalents	$ 325,000	$ 275,000	Accounts payable	$ 150,000	$ 75,000
Available-for-sale securities	165,000	145,000	Notes payable	50,000	50,000
Accounts receivable (net)	120,000	115,000	Accrued interest on note	5,000	5,000
Notes receivable	55,000	40,000	Current maturities of L.T. debt	100,000	100,000
Inventories	85,000	55,000	Accrued salaries and wages	15,000	10,000
Prepaid expenses	10,000	5,000	Income taxes payable	70,000	35,000
Total current assets	**$ 760,000**	**$ 635,000**	**Total current liabilities**	**$ 390,000**	**$ 275,000**
NONCURRENT ASSETS:			**NONCURRENT LIABILITIES:**		
Equity-method investments	$ 120,000	$ 115,000	Bonds payable	$ 500,000	$ 600,000
Property, plant, and equipment	1,000,000	900,000	Long-term notes payable	90,000	60,000
Less: Accum. depreciation	(85,000)	(55,000)	Employee-related obligations	15,000	10,000
Goodwill	5,000	5,000	Deferred income taxes	5,000	5,000
Total noncurrent assets	**$1,040,000**	**$ 965,000**	**Total noncurrent liabilities**	**$ 610,000**	**$ 675,000**
			Total liabilities	**$1,000,000**	**$ 950,000**
			STOCKHOLDERS' EQUITY:		
			Preferred stock, $50 par	$ 120,000	$ 0
			Common stock, $1 par	500,000	500,000
			Additional paid-in capital	110,000	100,000
			Retained earnings	70,000	50,000
			Total stockholders' equity	**$ 800,000**	**$ 650,000**
Total assets	**$1,800,000**	**$1,600,000**	**Total liabilities and stockholders' equity**	**$1,800,000**	**$1,600,000**

EXAMPLE 8-2 Income Statement

	Current Year	Prior Year
Net sales	$1,800,000	$1,400,000
Cost of goods sold	(1,450,000)	(1,170,000)
Gross profit	$ 350,000	$ 230,000
SG&A expenses	(160,000)	(80,000)
Operating income	$ 190,000	$ 150,000
Other revenues and losses	(40,000)	(25,000)
Earnings before interest and taxes	$ 150,000	$ 125,000
Interest expense	(15,000)	(10,000)
Earnings before taxes	$ 135,000	$ 115,000
Income taxes (40%)	(54,000)	(46,000)
Net income	$ 81,000	$ 69,000

NOTE: This balance sheet and income statement provide inputs for the examples throughout this subunit.

2. **Receivables**

a. Accounts receivable turnover measures the efficiency of accounts receivable collection.

Accounts Receivable Turnover

$$\frac{\text{Net credit sales}}{\text{Average accounts receivable}}$$

1) Average accounts receivable equals beginning accounts receivable plus ending accounts receivable, divided by 2.

a) If a business is highly seasonal, a simple average of beginning and ending balances is inadequate. The monthly balances should be averaged instead.

2) EXAMPLE: All of the company's sales are on credit. Accounts receivable at the beginning of the prior year were $105,000.

Current Year: $1,800,000 ÷ [($120,000 + $115,000) ÷ 2] = 15.3 times
Prior Year: $1,400,000 ÷ [($115,000 + $105,000) ÷ 2] = 12.7 times

a) The company turned over its accounts receivable balance 2.6 more times during the current year, even as receivables were growing in absolute terms. Thus, the company's effectiveness at collecting accounts receivable has improved noticeably.

3) A higher turnover implies that customers may be paying their accounts promptly.

a) Because sales are the numerator, higher sales without an increase in receivables will result in a higher turnover. Because receivables are the denominator, encouraging customers to pay quickly (thereby lowering the balance in receivables) also results in a higher turnover ratio.

4) A lower turnover implies that customers are taking longer to pay.

a) If the discount period is extended, customers will be able to wait longer to pay while still getting the discount.

b. Days' sales outstanding in receivables (also called the average collection period) measures the average number of days it takes to collect a receivable.

Days' Sales Outstanding in Receivables

$$\frac{\text{Days in year}}{\text{Accounts receivable turnover}}$$

1) EXAMPLE: Current Year: 365 days ÷ 15.3 times = 23.9 days*
Prior Year: 365 days ÷ 12.7 times = 28.7 days

*Uses rounded number (15.3 times). The result, 23.9 days, will be used in later figures.

a) Because the denominator [calculated in item 2.a.2)] increased and the numerator is a constant, days' sales will necessarily decrease. In addition to improving its collection practices, the company also may have become better at assessing the creditworthiness of its customers.

2) Besides 365, other possible numerators are 360 (for simplicity) and 300 (the number of business days in a year).

3) Days' sales outstanding in receivables can be compared with the firm's credit terms to determine whether the average customer is paying within the credit period.

3. **Inventory**

   a. Inventory turnover measures the efficiency of inventory management. In general, the higher the turnover, the better inventory is being managed.

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

      1) Average inventory equals beginning inventory plus ending inventory, divided by 2.

         a) If a business is highly seasonal, a simple average of beginning and ending balances is inadequate. The monthly balances should be averaged instead.

      2) EXAMPLE: The balance in inventories at the beginning of the prior year was $45,000.

         Current Year: $1,450,000 ÷ [($85,000 + $55,000) ÷ 2] = 20.7 times
         Prior Year: $1,170,000 ÷ [($55,000 + $45,000) ÷ 2] = 23.4 times

         a) The company did not turn over its inventories as many times during the current year. This is to be expected during a period of growing sales (and building inventory level) and so is not necessarily a sign of poor inventory management.

      3) A higher turnover implies strong sales or that the firm may be carrying low levels of inventory.

      4) A lower turnover implies that the firm may be carrying excess levels of inventory or inventory that is obsolete.

         a) Because cost of goods sold is the numerator, higher sales without an increase in inventory balances result in a higher turnover.

         b) Because inventory is the denominator, reducing inventory levels also results in a higher turnover ratio.

      5) The ideal level for inventory turnover is industry specific, with the nature of the inventory items impacting the ideal ratio. For example, spoilable items such as meat and dairy products will mandate a higher turnover ratio than would natural resources such as gold, silver, and coal. Thus, a grocery store should have a much higher inventory turnover ratio than a uranium mine or a jewelry store.

   b. Days' sales in inventory measures the efficiency of the company's inventory management practices.

$$\textbf{Days' Sales in Inventory} = \frac{\text{Days in year}}{\text{Inventory turnover}}$$

      1) EXAMPLE: Current Year: 365 days ÷ 20.7 times = 17.6 days
         Prior Year: 365 days ÷ 23.4 times = 15.6 days

         a) Because the numerator is a constant, the decreased inventory turnover calculated meant that days' sales tied up in inventory would increase. This is a common phenomenon during a period of increasing sales. However, it can also occur during periods of declining sales.

4. **Payables**

   a. Accounts payable turnover measures the efficiency with which a firm manages the payment of vendors' invoices.

$$\textbf{Accounts Payable Turnover} = \frac{\text{Purchases}}{\text{Average accounts payable}}$$

   1) Average accounts payable equals beginning accounts payable plus ending accounts payable, divided by 2.

      a) If a business is highly seasonal, a simple average of beginning and ending balances is inadequate. The monthly balances should be averaged instead.

   2) EXAMPLE: The company had current- and prior-year purchases of $1,480,000 and $1,220,000, respectively. Net accounts payable at the beginning of the prior year was $65,000.

      Current Year: $1,480,000 ÷ [($150,000 + $75,000) ÷ 2] = 13.2 times
      Prior Year: $1,220,000 ÷ [($75,000 + $65,000) ÷ 2] = 17.4 times

      a) The company is now carrying a much higher balance in payables, so it is not surprising that the balance is turning over less often. It also may be the case that the company was paying invoices too soon in the prior year.

   3) A higher turnover implies that the firm is taking less time to pay off suppliers and may indicate that the firm is taking advantage of discounts.

   4) A lower turnover implies that the firm is taking more time to pay off suppliers and forgoing discounts.

   b. Days' purchases in accounts payable measures the average number of days it takes to settle a payable.

$$\textbf{Days' Purchases in Accounts Payable} = \frac{\text{Days in year}}{\text{Accounts payable turnover}}$$

   1) EXAMPLE: Current Year: 365 days ÷ 13.2 times = 27.7 days*
      Prior Year: 365 days ÷ 17.4 times = 21.0 days

      *The rounded number, 13.2, yields 27.7 days, which will be used in later calculations.

      a) The slower turnover lowers the denominator, thereby increasing the days' purchases in payables. This substantially extended period reflects mostly the fact that the balance in payables has doubled. It also may imply that the company was paying its suppliers too quickly in the prior year.

   2) The days' purchases in accounts payable can be compared with the average credit terms offered by a company's suppliers to determine whether the firm is paying its invoices on a timely basis (or too soon).

5. Operating Cycle

a. A firm's operating cycle is the amount of time that passes between the acquisition of inventory and the collection of cash on the sale of that inventory.

Operating Cycle

Days' sales outstanding in receivables + Days' sales in inventory

1) EXAMPLE: Current Year: 23.9 days + 17.6 days = 41.5 days
Prior Year: 28.7 days + 15.6 days = 44.3 days

a) The company has managed to slightly reduce its operating cycle, even while increasing sales and building inventories.

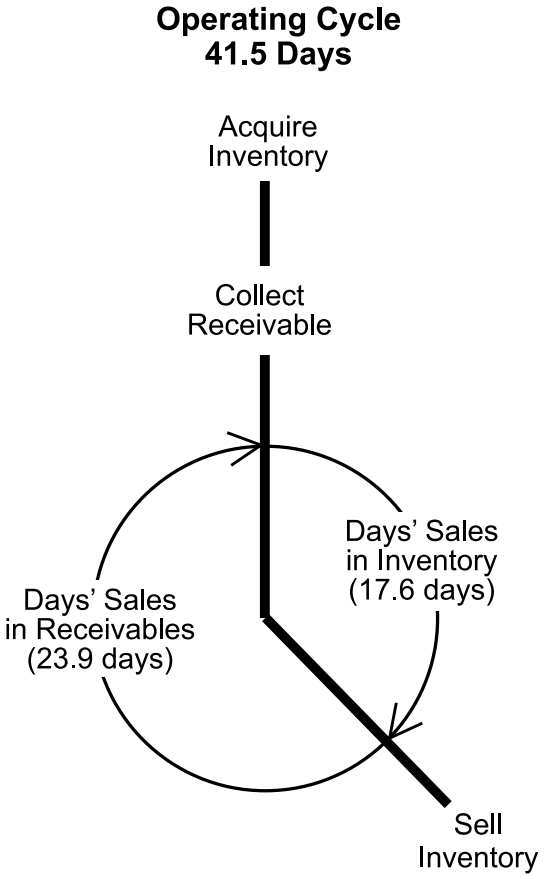


Figure 8-1

2) For example, the operating cycle for a grocery store may be as short as 2 or 3 weeks, and the operating cycle for a jewelry store may be over a year.

6. **Cash Cycle**

   a. The cash cycle is that portion of the operating cycle that is not accounted for by days' purchases in accounts payable.

      1) This is somewhat counterintuitive because the cash cycle is the portion of the operating cycle when the company does **not** have cash, i.e., when cash is tied up in the form of inventory or accounts receivable.

         Operating cycle – Days' purchases in accounts payable

      2) EXAMPLE: Current Year: 41.5 days – 27.7 days = 13.8 days
         Prior Year: 44.3 days – 21.0 days = 23.3 days

         a) Of the company's total operating cycle of 41.5 days, cash is held for the 27.7 days that payables are outstanding. The 13.8 days of the cash cycle represent the period when cash is tied up as other forms of current assets.

7. **Working Capital**

   a. The working capital turnover ratio measures how effectively a company is using working capital to generate sales.

Working Capital Turnover

$$\frac{\text{Sales}}{\text{Working capital}}$$

      1) Working capital equals current assets minus current liabilities.

      2) EXAMPLE: Current Year: $1,800,000 ÷ ($760,000 – $390,000) = 4.86 times
         Prior Year: $1,400,000 ÷ ($635,000 – $275,000) = 3.89 times

         a) The company turned over its working capital balance .97 more times during the current year, even as working capital was growing in absolute terms. Thus, the company's effectiveness at producing sales with working capital has improved.

      3) A higher turnover implies that the company is generating a lot of sales for the amount of money it takes to generate those sales.

8. **Other Activity Concepts**

   a. The fixed assets turnover ratio measures how efficiently the company is deploying its investment in net property, plant, and equipment (PPE) to generate revenues.

Fixed Assets Turnover Ratio

$$\frac{\text{Net sales}}{\text{Average net property, plant, and equipment}}$$

      1) Average net property, plant, and equipment equals beginning PPE plus ending PPE, divided by 2.

      2) EXAMPLE: Two years ago, net property, plant, and equipment was $860,000.

         Current Year: $1,800,000 ÷ [($915,000 + $845,000) ÷ 2] = 2.05 times
         Prior Year: $1,400,000 ÷ [($845,000 + $860,000) ÷ 2] = 1.64 times

      3) A higher turnover implies effective use of net property, plant, and equipment to generate sales.

      4) This ratio is largely affected by the capital intensiveness of the company and its industry, by the age of the assets, and by the depreciation method used.

b. The total assets turnover ratio measures how efficiently the company is deploying the totality of its resources to generate revenues.

Total Assets Turnover Ratio

$$\frac{\text{Net sales}}{\text{Average total assets}}$$

1) Average total assets equals beginning total assets plus ending total assets, divided by 2.

2) EXAMPLE: Total assets 2 years ago were $1,520,000.

Current Year: $1,800,000 ÷ [($1,800,000 + $1,600,000) ÷ 2] = 1.06 times
Prior Year: $1,400,000 ÷ [($1,600,000 + $1,520,000) ÷ 2] = .897 times

3) A higher turnover implies effective use of net assets to generate sales.

4) Certain assets, for example, investments, do not relate to net sales. Their inclusion decreases the ratio.

8.2 SHORT-TERM FINANCING

1. Basics

a. Companies will often procure short-term financing to obtain funds for short-term objectives, such as financing working needs.

b. Some loan terms describe discount rates using **basis points**. A basis point is one-hundredth of 1%.

1) EXAMPLE: 300 basis points equals 3%.

c. Sources of short-term financing include the following:

1) Market-based instruments,

2) Spontaneous sources (those that arise in the normal course of business, such as accounts payable), and

3) Commercial banks.

2. Spontaneous Forms of Financing

a. **Trade credit** resulting in accounts payable is the largest source of credit for small firms. It is created when a firm is offered credit terms by its suppliers.

1) Trade credit allows a customer to purchase goods on account (not using cash), receive the goods, and pay the supplier at a later date. Trade credit is usually given for a specific number of days (i.e., 30, 60, or 90).

a) Trade credit terms are usually given as 2/10, net 30. This means that the firm will receive a 2% discount if the entire balance is paid within 10 days and that the entire balance, whether or not the discount is taken, is due within 30 days.

b) When the discount is taken, the amount of usable funds required can be calculated as follows:

Usable funds = Invoice amount × (1.0 – Discount %)

c) EXAMPLE: A firm received an invoice for $120,000 with terms of 2/10, net 30, and the firm wishes to pay within the discount window.

$$\begin{aligned}\text{Amount needed} &= \text{Invoice amount} \times (1.0 - \text{Discount \%}) \\ &= \$120{,}000 \times (100\% - 2\%) \\ &= \$120{,}000 \times 98\% \\ &= \$117{,}600\end{aligned}$$

2) EXAMPLE: Vendor A delivers goods to Firm B at a price of $160,000 with the balance due in 30 days. Firm B has effectively received a 30-day, interest-free loan.

3) The advantages of trade credit are that it is widely available and is free during the discount period.

b. Accrued expenses, such as salaries, wages, interest, dividends, and taxes payable, are other sources of (interest-free) spontaneous financing.

1) For instance, employees work 5, 6, or 7 days a week but are paid only every 2 weeks.

2) Accruals have the additional advantage of fluctuating directly with operating activity, satisfying the matching principle.

3. **Cost of Not Taking a Discount**

a. If an early payment discount is offered, the firm ordinarily should take the discount.

1) In order to take the discount, the firm must either have enough funds on hand or use an alternative source of financing to acquire the funds early enough to pay within the discount window.

a) This means that a firm must decide, given its financial capabilities, whether taking the discount is the best course of action.

b) In some cases, the costs of **not** taking the discount are less than the costs of the alternative sources of financing that would be necessary if the firm were to take the discount. In situations like this, the firm should not take the discount.

2) The **annualized cost** of not taking a discount can be calculated with the following formula:

$$\frac{\text{Discount \%}}{\text{100\% – Discount \%}} \times \frac{\text{Days in year}}{\text{Total payment period – Discount period}}$$

3) EXAMPLE: A vendor has delivered goods on terms of 2/10, net 30. The firm has chosen to pay on day 30. The effective rate paid by not taking the discount is calculated as follows (using a 360-day year):

$$\begin{aligned}\text{Cost of not taking discount} &= [2\% \div (100\% - 2\%)] \times [360 \text{ days} \div (30 \text{ days} - 10 \text{ days})] \\ &= (2\% \div 98\%) \times (360 \text{ days} \div 20 \text{ days}) \\ &= 2.0408\% \times 18 \\ &= 36.73\%\end{aligned}$$

The firm chose to finance $160,000 for 30 days rather than $156,800 ($160,000 × 98%) for 10 days. In effect, the cost is $3,200 ($160,000 – $156,800) to finance the last 20 days. Only companies in dire cash flow situations would incur a 36.73% cost of funds.

4. **Short-Term Bank Loans**

   a. Commercial banks offer term loans and lines of credit. These loans are second only to spontaneous credit as a source of short-term financing.

      1) The advantage is that bank loans provide financing not available from trade credit, etc. Thus, a firm can benefit from growth opportunities. The disadvantages are

         a) The increased risk of insolvency,

         b) The risk that short-term loans may not be renewed, and

         c) The imposition of contractual restrictions, such as a compensating balance requirement.

      2) A **term loan**, such as a note, must be repaid by a certain date.

      3) A **line of credit** is an informal borrowing arrangement, generally for a 1-year period. It allows the debtor to reborrow amounts up to a maximum, as long as certain minimum payments are made each month (similar to a consumer's credit card).

         a) An advantage of a line of credit is that it is often an unsecured loan (one for which no collateral is required). It is **self-liquidating**; that is, the assets acquired (e.g., inventory) provide the cash to pay the loan.

         b) A major disadvantage of a line of credit is that it is not a legal commitment to give credit, thus, it might not be renewed. A second is that a bank might require the borrower to "clean up" its debt for a certain period during the year, e.g., for 1 or 2 months.

5. **Effective Interest Rate on a Loan**

   a. The effective rate on any financing arrangement is the ratio of the amount the firm must pay to the amount the firm can use. The most basic statement of this ratio uses the dollar amounts generated by the equations illustrated on the previous pages.

$$\text{Effective interest rate} = \frac{\text{Net interest expense}}{\text{Usable funds}}$$

   b. As with all financing arrangements, the effective rate can be calculated without reference to dollar amounts:

$$\text{Effective rate on discounted loan} = \frac{\text{Stated rate}}{(1.0 - \text{Stated rate})}$$

      1) EXAMPLE: The firm calculates the effective rate on this loan without using dollar amounts.

$$\begin{aligned}\text{Effective rate} &= \text{Stated rate} \div (1.0 - \text{Stated rate}) \\ &= 8\% \div (100\% - 8\%) \\ &= 8\% \div 92\% \\ &= 8.696\%\end{aligned}$$

   c. The **prime rate** is the interest rate that a bank charges its best customers. The prime rate is the lowest rate that a lender is willing to accept from its least risky customers.

6. **Simple Interest Loans**
   a. A simple interest loan is one in which the interest is paid at the end of the loan term.
   b. With simple interest loans, the loan amount is equal to the amount of usable funds actually received by the borrower.
   c. The total amount of interest is the loan amount times the stated rate.

$$\text{Interest expense} = \text{Loan amount} \times \text{Stated rate}$$

      1) EXAMPLE: A firm's bank will lend the firm $120,000 for 1 year at a nominal annual rate of 6%, due at the end of the loan term.

$$\begin{aligned}\text{Interest expense} &= \text{Loan amount} \times \text{Stated rate}\\ &= \$120{,}000 \times 6\%\\ &= \$7{,}200\end{aligned}$$

   d. The effective rate and the nominal rate on a simple interest loan are the same.
      1) EXAMPLE: The firm calculates the effective rate on this loan as follows:

$$\begin{aligned}\text{Effective rate} &= \text{Net interest expense} \div \text{Usable funds}\\ &= \$7{,}200 \div \$120{,}000\\ &= 6.0\%\end{aligned}$$

7. **Discounted Loans**
   a. A discounted loan essentially requires the interest to be paid at the beginning of the loan term.
   b. If interest must be paid at the beginning of the loan term, the amount of usable funds actually received by the borrower is the loan amount minus any interest. Once the amount of usable funds is known, the loan amount can be calculated as follows:

$$\text{Loan amount} = \frac{\text{Usable funds}}{(1.0 - \text{Stated rate})}$$

      1) EXAMPLE: A firm needs $90,000 of usable funds. Its bank has offered to make a loan at an 8% nominal rate on a discounted basis.

$$\begin{aligned}\text{Loan amount} &= \text{Usable funds} \div (1.0 - \text{Stated rate})\\ &= \$90{,}000 \div (100\% - 8\%)\\ &= \$90{,}000 \div 92\%\\ &= \$97{,}826\end{aligned}$$

   c. The total amount of interest is the loan amount times the stated rate.

$$\text{Interest expense} = \text{Loan amount} \times \text{Stated rate}$$

   d. Because the borrower has the use of a smaller amount, the effective rate on a discounted loan is higher than its nominal rate:

$$\begin{aligned}\text{Effective rate} &= \text{Net interest expense} \div \text{Usable funds}\\ &= (\$97{,}826 \times 8\%) \div \$90{,}000\\ &= \$7{,}826 \div \$90{,}000\\ &= 8.696\%\end{aligned}$$

   e. Discounted loans are sometimes used by a financial institution to enable it to advertise a lower interest rate. For instance, in the example above, the bank quotes an interest rate of 8%, but the real rate paid by the borrower is 8.696%.

8. Loans with Compensating Balances

a. Rather than charge cash interest, banks sometimes require borrowers to maintain a compensating balance during the term of a financing arrangement.

$$\text{Loan amount} = \frac{\text{Usable funds}}{(1.0 - \text{Compensating balance \%})}$$

1) EXAMPLE: A firm has received an invoice for $120,000 with terms of 2/10, net 30. The firm's bank will lend it the necessary amount for 30 days at a nominal annual rate of 6% with a compensating balance of 10%.

Loan amount = Usable funds ÷ (1.0 – Compensated balance %)
= ($120,000 × 98%) ÷ (100% – 10%)
= $117,600 ÷ 90%
= $130,667

b. As with a discounted loan, the borrower has access to a smaller amount than the face amount of the loan and so pays an effective rate higher than the nominal rate.

Effective rate = Net interest expense ÷ Usable funds
= ($130,667 × 6%) ÷ $117,600
= $7,840 ÷ $117,600
= 6.667%

c. Once again, the dollar amounts involved are not needed to determine the effective rate.

$$\text{Effective rate with comp. balance} = \frac{\text{Stated rate}}{(1.0 - \text{Compensating balance \%})}$$

Effective rate = Stated rate ÷ (1.0 – Compensating balance %)
= 6% ÷ (100% – 10%)
= 6% ÷ 90%
= 6.667%

d. If the loan is offered on a discounted basis with a compensating balance requirement, the formula for the effective rate is

$$\text{Effective rate} = \frac{\text{Stated rate}}{(1.0 - \text{Stated rate} - \text{Compensating balance \%})}$$

9. **Lines of Credit with Commitment Fees**

   a. A line of credit is the right to draw cash at any time up to a specified maximum. A line of credit may have a definite term, or it may be revolving; that is, the borrower can continuously pay off and reborrow from it.

      1) Sometimes a bank charges a borrower a commitment fee on the unused portion.

      2) EXAMPLE: A firm's bank extended a $1,000,000 line of credit at a nominal rate of 8% with a 0.5% commitment fee on the unused portion. The average loan balance during the year was $400,000.

Annual cost = Interest expense on average balance + Commitment fee on unused portion
= (Average balance × Stated rate) + [(Credit limit – Average balance) × Commitment fee %]
= ($400,000 × 8%) + [($1,000,000 – $400,000) × 0.5%]
= $32,000 + $3,000
= $35,000

10. **Market-Based Instruments**

   a. **Bankers' acceptances** can be sources of short-term financing.

      1) After acceptance, the drawer is no longer the primary responsible party and can sell the instrument to an investor at a discount.

      2) Once the instrument's term is reached after, for example, 90 days, the investor presents it to the accepting bank and demands payment.

      3) At that time, the drawer must have sufficient funds on deposit at the bank to cover it.

         a) In this way, the drawer obtained financing for 90 days.

      4) Bankers' acceptances are sold on a discount basis. The difference between the face amount and the proceeds received from the investor is interest expense to the drawer.

   b. **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.

      1) The annualized rate of commercial paper can be calculated as follows:

$$\text{Annualized rate} = \frac{\text{Face value} - \text{Net proceeds}}{\text{Net proceeds}} \times \text{Number of terms per year}$$

      2) Commercial paper is a lower-cost source of funds than bank loans. It is usually issued at below the prime rate.

      3) No general secondary market exists for commercial paper.

      4) The advantages of commercial paper are that it (a) provides broad and efficient distribution, (b) provides a great amount of funds (at a given cost), and (c) avoids costly financing arrangements.

      5) The disadvantages are that (a) it is an impersonal market and (b) the total amount of funds available is limited to the excess liquidity of big corporations.

11. **Secured Financing**

    a. Loans can be secured by pledging receivables, i.e., committing the proceeds of the receivables to paying off the loan.

        1) A bank often lends up to 80% of outstanding receivables, depending upon the average age of the accounts and the probability of collection.

    b. A trust receipt is an instrument issued by a borrower that provides inventory as collateral. It is signed by the borrower and acknowledges that

        1) The inventory is held in trust for the lender, and
        2) Any proceeds of sale are to be paid to the lender.

    c. A **chattel mortgage** is a loan secured by personal property (movable property such as equipment or livestock).

        1) A **floating lien** is a loan secured by property, such as inventory, the composition of which may be constantly changing.

12. **Maturity Matching**

    a. Maturity matching equalizes the life of an acquired asset with the debt instrument used to finance it. Because it mitigates financial risk, maturity matching is a hedging approach to financing.

        1) For instance, a debt due in 30 days should be paid with funds currently invested in a 30-day marketable security, not with proceeds from a 10-year bond issue.

        2) Moreover, long-term debt should not be paid with funds needed for day-to-day operations. Careful planning is needed to ensure that dedicated funds are available to retire long-term debt as it matures.

    b. In general, as a company increases the amount of short-term financing relative to long-term financing, the greater the risk that it will be unable to meet principal and interest payments. An increase in the proportion of short-term financing does not affect a borrower's degree of leverage. But risk is increased because of the need for frequent refinancing.

8.3 LONG-TERM FINANCING

1. **Leases**
    a. A lease is a long-term, contractual agreement in which the owner of property (the lessor) allows another party (the lessee) the right to use the property for a stated period in exchange for a stated payment.
        1) Leases are a well-structured and widely used tool for obtaining the use of long-lived assets without tying up the large amounts of capital that would be needed for an outright purchase (U.S. airlines routinely lease anywhere from one-quarter to one-half of their passenger jets).
    b. Another issue is deciding whether to finance an asset purchase using lease financing or debt financing.
        1) Management should select the financing option that results in the lowest present value of **after-tax outflows**.
            a) After-tax outflows consider the effect of interest expense and depreciation expense on cash outflows. These expenses create tax-shield benefits that offset lease, or loan, payments (i.e., cash outflows) in an amount equal to the firm's tax rate multiplied by the expense.
        2) The difference between the present value of the lease financing option and the present value of the debt financing option, or present value of the cost of owning, is the **net advantage to leasing**.
2. **Convertible Securities**
    a. Convertible securities are debt or preferred stock securities that contain a provision allowing the holder to convert the securities into some specified number of common shares after a specified time has elapsed.
        1) The conversion feature is an enticement to potential investors that allows the corporation to raise capital at a cost lower than a straight new common equity issue.
3. **Stock Purchase Warrants**
    a. A stock purchase warrant is, in effect, a call option on the corporation's common stock. After a specified time has elapsed, the holder of the warrant can exchange the warrant plus a specified amount of cash for some number of shares of common stock.
        1) Warrants are used to lower the cost of debt.
4. **Retained Earnings**
    a. Retained earnings are the cumulative accrual-basis income of the corporation minus amounts paid out in cash dividends minus amounts reclassified as additional paid-in capital from stock dividends.
        1) Retained earnings are the lowest-cost form of capital (all internally generated, no issue costs).

STUDY UNIT NINE

INVESTMENT DECISIONS

Investment Decisions

Management accountants must be able to help management analyze decisions. This involves making cash flow estimates, calculating the time value of money, and being able to apply discounted cash flow concepts, such as net present value and internal rate of return. Non-discounting analysis techniques are also covered on the CMA exam, as are the income tax implications for investment decision analysis. Candidates will also be tested on such things as ranking investment projects, performing risk analysis, and evaluating real options.

This study unit is on **investment decisions**. The relative weight assigned to this major topic in Part 2 of the exam is **10%**.

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

9.1 THE CAPITAL BUDGETING PROCESS

1. Capital Budgeting

a. Capital budgeting is the process of identifying, analyzing, and selecting investments in long-term projects. It is this long-term aspect of capital budgeting that presents the management accountant with specific challenges.

1) By their nature, capital projects affect multiple accounting periods and will constrain the organization's financial planning well into the future. Once made, capital budgeting decisions tend to be relatively inflexible, unless real options exist (real options are covered in Subunit 9.2).

2) An **opportunity cost** is the maximum benefit forgone by using a scarce resource for a given purpose and not for the next-best alternative.

a) In capital budgeting, the most basic application of this concept is the desire to invest the company's limited funds in the most promising capital project(s).

b. Capital budgeting applications include

1) Buying equipment
2) Building facilities
3) Acquiring a business
4) Developing a product or product line
5) Expanding into new markets

c. A firm must accurately forecast future changes in demand in order to have the necessary production capacity when demand for its product is strong, without having excess idle capacity when demand slackens.

d. Planning is crucial because of possible changes in capital markets, inflation, interest rates, and the money supply.

e. As with every other business decision, the tax consequences of a new investment (and possible disinvestment of a replaced asset) must be considered.

1) All capital budgeting decisions need to be evaluated on an after-tax basis because taxes may affect decisions differently. Companies that operate in multiple tax jurisdictions may find the decision process more complex.

a) Another possibility is that special tax concessions may be negotiated for locating an investment in a given locale.

2. Types of Costs Considered in Capital Budgeting Analysis

NOTE: These costs are also covered in Study Unit 11, Subunit 1.

a. **Relevant** costs differ among alternatives.

1) Relevant costs are **avoidable** and may be eliminated by ceasing an activity or by improving efficiency.

2) An **incremental** cost is the increase in total cost resulting from selecting one option instead of another.

b. **Irrelevant costs** do not vary between different alternatives and therefore do not affect the decision.

1) A **sunk cost** cannot be avoided because it occurred in the past.

a) A sunk cost is irrelevant because it has already been incurred and cannot be changed.

b) An example is the amount of money already spent on manufacturing equipment.

2) A **committed cost** is a cost that will be incurred in the future due to previously made decisions.

a) An example is a future lease payment in a long-term lease.

3. The Stages in Capital Budgeting

a. Identification and definition. Those projects and programs that are needed to attain the entity's objectives are identified and defined.

1) For example, a firm that wishes to be the low-cost producer in its industry will be interested in investing in more efficient manufacturing machinery. A company that wishes to quickly expand into new markets will look at acquiring another established firm.

2) Defining the projects and programs determines their extent and facilitates cost, revenue, and cash flow estimation.

a) This stage is the most difficult.

b. Search. Potential investments are subjected to a preliminary evaluation by representatives from each function in the entity's value chain.

1) Dismal projects are dismissed at this point, while others are passed on for further evaluation.

c. Information-acquisition. The costs and benefits of the projects that passed the search phase are enumerated.

1) Quantitative financial measures are given the most scrutiny at this point.

a) These include initial investment and periodic cash inflow.

2) Nonfinancial measures, both quantitative and qualitative, are also identified and addressed.

a) Examples include the need for additional training on new equipment and higher customer satisfaction based on improved product quality.

b) Also, uncertainty about technological developments, demand, competitors' actions, governmental regulation, and economic conditions should be considered.

d. Selection. Employing one of the selection models (net present value, internal rate of return, etc.) and relevant nonfinancial measures, the project(s) that will increase shareholder value by the greatest margin is (are) chosen for implementation.

e. Financing. Sources of funds for selected projects are identified. These can come from the company's operations, the issuance of debt, or the sale of the company's stock.

f. Implementation and monitoring. Once projects are underway, they must be kept on schedule and within budgetary constraints.

1) This step also involves determining whether previously unforeseen problems or opportunities have arisen and what changes in plans are appropriate.

4. **Steps in Ranking Potential Investments**

a. Capital budgeting requires choosing among investment proposals. Thus, a ranking procedure for such decisions is needed. The following are steps in the ranking procedure:

1) **Determine the asset cost or net investment.**

a) The net investment is the net outlay, or gross cash requirement, minus cash recovered from the trade or sale of existing assets, with any necessary adjustments for applicable tax consequences. Cash outflows in subsequent periods also must be considered.

b) Moreover, the investment required includes funds to provide for increases in net working capital, for example, the additional receivables and inventories resulting from the acquisition of a new manufacturing plant.

i) This **change in net working capital** is treated as an initial cost of the investment (a cash outflow) that will be recovered at the end of the project (i.e., the salvage value is equal to the initial cost).

2) **Calculate estimated cash flows**, period by period, using the acquired assets.
   a) Reliable estimates of cost savings or revenues are necessary.
   b) Net cash flow is the economic benefit or cost, period by period, resulting from the investment.
   c) Economic life is the time period over which the benefits of the investment proposal are expected to be obtained, as distinguished from the physical or technical life of the asset involved.
   d) Depreciable life is the period used for accounting and tax purposes over which cost is to be systematically and rationally allocated. It is based upon permissible or standard guidelines and may have no particular relevance to economic life.
      i) Because depreciation is deductible for income tax purposes, thereby shielding some revenue from taxation, depreciation gives rise to a depreciation tax shield.
3) **Relate the cash-flow benefits to their cost** by using one of several methods to evaluate the advantage of purchasing the asset.
4) **Rank the investments.**
   a) A firm's **hurdle rate** is the minimum rate of return on a project or investment that an investor is willing to accept.
      i) The riskier the project, the higher the hurdle rate.
      ii) The lower the firm's discount rate, the lower the acceptable hurdle rate.
      iii) A common pitfall in capital budgeting is the tendency to use the company's current rate of return as the hurdle rate. This can lead to rejecting projects that should be accepted.

5. **Cash Flows**
   a. Relevant cash flows are a much more reliable guide when judging capital projects because only they provide a true measure of a project's potential to affect shareholder value.
      1) The relevant cash flows can be divided into the following three categories:
         a) **Net initial investment**
            i) Cost of new equipment
            ii) Initial working capital requirements
            iii) After-tax proceeds from disposal of old equipment
         b) **Annual net cash flows**
            i) After-tax cash collections from operations (excluding depreciation effect)
            ii) Tax savings from depreciation deductions (depreciation tax shield)

On the exam, you may be required to calculate depreciation using the Modified Accelerated Cost Recovery System (MACRS). Under this system, the depreciation expense for each period is calculated by multiplying the cost of the depreciable asset by the MACRS rate for the respective period. The MACRS rate for each period will be provided in the question stem.

         c) **Project termination cash flows**
            i) After-tax proceeds from disposal of new equipment
            ii) Recovery of working capital (untaxed)

EXAMPLE 9-1 Projected Relevant Cash Flows

A company is determining the relevant cash flows for a potential capital project. The company has a 40% tax rate.

Net initial investment:

1) The project will require an initial outlay of $500,000 for new equipment.
2) The company expects to commit $12,000 of working capital for the duration of the project in the form of increased accounts receivable and inventories.
3) Calculating the after-tax proceeds from disposal of the existing equipment is a two-step process.
   a) First, the tax gain or loss is determined.

Disposal value	$ 5,000
Less: Tax basis	(20,000)
Tax-basis loss on disposal	**$(15,000)**

   b) The after-tax effect on cash can then be calculated.

Disposal value	$ 5,000
Add: Tax savings on loss ($15,000 × .40)	6,000
After-tax cash inflow from disposal	**$11,000**

4) The cash outflow required for this project's net initial investment is therefore $(501,000) [$(500,000) + $(12,000) + $11,000].

Annual net cash flows:

1) The project is expected to generate $100,000 annually from ongoing operations.
   a) However, 40% of this will have to be paid out in the form of income taxes.

Annual cash collections	$100,000
Less: Income tax expense ($100,000 × .40)	(40,000)
After-tax cash inflow from operations	**$ 60,000**

2) The project is slated to last 8 years.
   a) The new equipment is projected to have a salvage value of $50,000 and will generate $62,500 ($500,000 ÷ 8) per year in depreciation charges. The annual savings is $25,000 [($62,500 – $0) × .40].

   NOTE: On the CMA exam, salvage value is never subtracted when calculating the depreciable base for tax purposes because this is a provision allowed by U.S. tax laws.

   b) Unlike the income from operations, the depreciation charges will generate a tax savings. This is referred to as the **depreciation tax shield**.
3) The annual net cash inflow from the project is thus $85,000 ($60,000 + $25,000) for the last 8 years.

Project termination cash flows:

1) Proceeds of $50,000 are expected from disposal of the new equipment at the end of the project.
   a) First, the tax gain or loss is determined.

Disposal value	$50,000
Less: Tax basis	0
Tax-basis gain on disposal	**$50,000**

   b) The after-tax effect on cash can then be calculated.

Tax basis gain on disposal	$50,000
Less: Tax liability on gain ($50,000 × .40)	(20,000)
After-tax cash inflow from disposal	**$30,000**

2) Once the project is over, the company will recover the $12,000 of working capital committed to it.
3) The net cash inflow upon project termination is therefore $42,000 ($30,000 + $12,000).

b. As Example 9-1 above indicates, tax considerations are essential when considering capital projects.

6. **Other Considerations**

   a. Effects of inflation on capital budgeting.

      1) In an inflationary environment, future dollars are worth less than today's dollars. Thus, the firm will require a higher rate of return to compensate.

   b. Post-audits should be conducted to serve as a control mechanism and to deter managers from proposing unprofitable investments.

      1) Actual-to-expected cash flow comparisons should be made, and unfavorable variances should be explained. The reason may be an inaccurate forecast or implementation problems.

      2) Individuals who supplied unrealistic estimates should have to explain differences. Knowing that a post-audit will be conducted may cause managers to provide more realistic forecasts in the future.

      3) The temptation to evaluate the outcome of a project too early must be overcome. Until all cash flows are known, the results can be misleading.

      4) Assessing the receipt of expected nonquantitative benefits is inherently difficult.

9.2 RISK ANALYSIS AND REAL OPTIONS

1. **Risk analysis** attempts to measure the likelihood of the variability of future returns from the proposed capital investment. The following techniques are frequently used to analyze or account for risk:

   a. **Informal method.** NPVs are calculated at the firm's desired rate of return, and the possible projects are individually reviewed. If the NPVs are relatively close for two mutually exclusive projects, the apparently less risky project is chosen.

   b. **Risk-adjusted discount rates.** The discount rate of a capital investment is generally the company's cost of capital.

      1) However, when a capital investment is **more or less risky** than is normal for a company, its discount rate is adjusted accordingly. The discount rate is increased (above the company's cost of capital) for riskier projects, and decreased (below the company's cost of capital) for less risky projects.

      2) Thus, discount rates may vary among capital investments depending on the company's cost of capital and the type of investment.

      3) Additionally, some investments may be accepted (rejected) with internal rates of return (IRR) that are less than (greater than) the company's cost of capital (IRR is covered in detail in Subunit 9.3).

   c. **Certainty equivalent adjustments.** This technique is directly drawn from the concept of utility theory. It forces the decision maker to specify at what point the firm is indifferent to the choice between a certain sum of money and the expected value of a risky sum. The technique is not frequently used because decision makers are not familiar with the concept.

   d. **Simulation analysis.** This method represents a refinement of standard profitability theory. The computer is used to generate many examples of results based upon various assumptions. Project simulation is frequently expensive. Unless a project is exceptionally large and expensive, full-scale simulation is usually not worthwhile.

e. **Sensitivity analysis.** Forecasts of many calculated NPVs under various assumptions are compared to see how sensitive NPV is to changing conditions. Changing the assumptions about a certain variable or group of variables may drastically alter the NPV. Thus, the asset may appear to be much riskier than was originally predicted.

1) In summary, sensitivity analysis is simply an iterative process of recalculated returns based on changing assumptions.

f. **Scenario analysis.** The profitability of a capital investment is analyzed under various economic scenarios.

g. The **Monte Carlo Simulation** is used to generate the probability distribution of all possible outcomes from a capital investment.

1) The performance of a quantitative model under uncertainty may be investigated by randomly selecting values for each of the variables in the model (based on the probability distribution of each variable) and then calculating the value of the solution. This process is performed a large number of times.

2) Even with sophisticated mathematical models, the degree of risk can never be determined accurately. Mathematical approaches can be inaccurate because of the lack of critical information.

2. **Real options** are options to modify the capital investment.

a. Real options are not measurable with the same accuracy as financial options because the formulas applicable to the latter may not be appropriate for the former. Thus, other methods, e.g., decision-tree analysis with recognition of probabilities and outcomes and simulations, are used in conjunction with discounted cash flow methods.

b. Management accountants should be able to determine what real options are embedded in a project, to measure their value, and to offer advice about structuring a project to include such options. The following are among the types of real options:

1) **Abandonment** of a project entails selling its assets or employing them in an alternative project. Abandonment should occur when, as a result of an ongoing evaluation process, the entity determines that the abandonment value of a new or existing project exceeds the NPV of the project's future cash flows.

2) The option to **delay** allows the option holder to postpone implementation of the project without losing the opportunity.

a) The option holder should pay attention to costs and benefits as they change.

3) The option to **expand** allows the option holder to move forward with or expand a project after the initial stage has been implemented.

a) This allows a firm to expand its operation in the future at little or no cost.

4) The option to **scale back** allows the option holder to shrink a project after the initial stage has been implemented.

5) The flexibility option to vary inputs, for example, by switching fuels.

6) The capacity option to vary output, for example, to respond to economic conditions by raising or lowering output or by temporarily shutting down.

7) The option to enter a new geographical market, for example, in a market where NPV is apparently negative but the follow-up investment option is promising.

8) The new product option, for example, the opportunity to sell a complementary or a next-generation product even though the initial product is unprofitable.

c. Qualitative considerations. Although real options may often not be readily quantifiable, adding them to a project is always a consideration because doing so is frequently inexpensive and the potential risk reduction is great.

1) The option is usually more valuable the later it is exercised, the more variable the underlying risk, or the higher the level of interest rates.

3. **Risk Tolerance and the Certainty Equivalent**

a. Risk tolerance is the acceptable degree of variability in returns.

1) A company with a high risk tolerance is willing to risk big losses for the chance at big gains.

2) A company with a low risk tolerance will avoid seeking big gains in order to avoid the possibility of big losses.

b. The certainty equivalent is the guaranteed return that a company would accept over taking a risk on a higher, but uncertain, return.

1) The certainty equivalent specifies at what point the company is indifferent to the choice between a certain sum of money and the expected value of a risky investment.

9.3 DISCOUNTED CASH FLOW ANALYSIS

CMA candidates can expect a variety of questions that will require the use of either Present Value or Future Value tables. The CMA exam will provide the necessary data to answer the question either within the given information of the question itself or through the Time Value tables. The Gleim online courses will familiarize you with how to use these tables on the actual exam by providing the necessary data within the question and by providing an emulation of how to access the Present/Future Value tables.

1. **Time Value of Money**

a. The **accounting rate of return** (i.e., the return divided by the investment) does not consider the time value of money.

b. However, a dollar received in the future is worth less than a dollar received today. Thus, when analyzing capital projects, the management accountant must discount the relevant cash flows using the time value of money.

c. A quantity of money to be received or paid in the future is worth less than the same amount now. The difference is measured in terms of interest calculated using the appropriate discount rate.

2. **Present and Future Value**

   a. Standard tables have been developed to facilitate the calculation of present and future values. Each entry in one of these tables represents the factor by which any monetary amount can be modified to obtain its present or future value.

   b. The **present value (PV) of a single amount** is the value today of some future payment.

      1) It equals the future payment times the present value of 1 (a factor found in a standard table) for the given number of periods and interest rate.

EXAMPLE 9-2 PV of a Single Amount

	Present Value		
No. of Periods	6%	8%	10%
1	0.943	0.926	0.909
2	0.890	0.857	0.826
3	0.840	0.794	0.751
4	0.792	0.735	0.683
5	0.747	0.681	0.621

The present value of $1,000, to be received in 3 years and discounted at 8%, is $794 ($1,000 × 0.794).

   c. The **future value (FV) of a single amount** is the amount available at a specified time in the future based on a single investment (deposit) today. The FV is the amount to be computed if one knows the present value and the appropriate discount rate.

      1) It equals the current payment times the future value of 1 (a factor found in a standard table) for the given number of periods and interest rate.

EXAMPLE 9-3 FV of a Single Amount

	Future Value		
No. of Periods	6%	8%	10%
1	1.0600	1.0800	1.1000
2	1.1236	1.1664	1.2100
3	1.1910	1.2597	1.3310
4	1.2625	1.3605	1.4641
5	1.3382	1.4693	1.6105

The future value of $1,000 invested today for 4 years at 10% interest will be $1,464 ($1,000 × 1.464).

d. **Annuities**

1) An annuity is usually a series of equal payments at equal intervals of time, e.g., $1,000 at the end of every year for 10 years.

a) An **ordinary annuity (annuity in arrears)** is a series of payments occurring at the end of each period.

i) The first payment of an ordinary annuity is discounted.
ii) Interest is not earned for the first period of an ordinary annuity.

b) An **annuity due (annuity in advance)** is a series of payments at the beginning of each period.

i) The first payment of an annuity due is not discounted.
ii) Interest is earned on the first payment of an annuity due.

EXAMPLE 9-4 PV -- Ordinary Annuity vs. Annuity Due

	Present Value		
No. of Periods	6%	8%	10%
1	0.943	0.926	0.909
2	1.833	1.783	1.736
3	2.673	2.577	2.487
4	3.465	3.312	3.170
5	4.212	3.993	3.791

To calculate the present value of an **ordinary annuity** of four payments of $1,000 each discounted at 10%, multiply $1,000 by the appropriate factor ($1,000 × 3.170 = $3,170).

Using the same table, the present value of an **annuity due** of four payments of $1,000 each also may be calculated. This value equals $1,000 times the factor for one less period (4 – 1 = 3), increased by 1.0. Thus, the present value of the annuity due for four periods at 10% is $3,487 [$1,000 × (2.487 + 1.0)].

The present value of the annuity due ($3,487) is greater than the present value of the ordinary annuity ($3,170) because the payments occur 1 year sooner.

c) The FV of an annuity is the value that a series of equal payments will have at a certain moment in the future if interest is earned at a given rate.

EXAMPLE 9-5 FV -- Ordinary Annuity vs. Annuity Due

	Future Value		
No. of Periods	6%	8%	10%
1	1.0000	1.0000	1.0000
2	2.0600	2.0800	2.1000
3	3.1836	3.2464	3.3100
4	4.3746	4.5061	4.6410
5	5.6371	5.8667	6.1051

To calculate the FV of a 3-year **ordinary annuity** with payments of $1,000 each at 6% interest, multiply $1,000 by the appropriate factor ($1,000 × 3.184 = $3,184).

The FV of an **annuity due** also may be determined from the same table. Multiply the $1,000 payment by the factor for one additional period (3 + 1 = 4) decreased by 1.0 (4.375 – 1.0 = 3.375) to arrive at a FV of $3,375 ($1,000 × 3.375).

The future value of the annuity due ($3,375) is greater than the future value of an ordinary annuity ($3,184). The deposits are made earlier.

3. **Net Present Value**

   a. The net present value (NPV) method expresses a project's return in **dollar terms**.

      1) NPV nets the expected **cash flows** (inflows and outflows) related to a project, then discounts them at the hurdle rate, also called the desired rate of return.

         a) If the NPV of a project is positive, the project is desirable because it has a higher rate of return than the company's desired rate.

EXAMPLE 9-6 NPV

The company discounts the relevant net cash flows using a hurdle rate of 6% (its desired rate of return).

Period	Net Cash Flow	6% PV Factor	Discounted Cash Flows
Initial Investment	$(501,000)	1.00000	$(501,000)
Year 1	77,000	0.94340	72,642
Year 2	77,000	0.89000	68,530
Year 3	77,000	0.83962	64,651
Year 4	77,000	0.79209	60,991
Year 5	85,000	0.74726	63,517
Year 6	85,000	0.70496	59,922
Year 7	85,000	0.66506	56,530
Year 8	101,800	0.62741	63,870
Net Present Value			**$ 9,653**

Because the project has NPV greater than $0, it is desirable given the company's hurdle rate.

4. **Internal Rate of Return**

   a. The internal rate of return (IRR) expresses project's return in **percentage terms**.

      1) The IRR of an investment is the discount rate at which the investment's NPV equals zero. In other words, it is the rate that makes the present value of the expected cash inflows equal the present value of the expected cash outflows.

         a) If the IRR is higher than the company's desired rate of return, then the investment is desirable.

EXAMPLE 9-7 IRR

Using the same relevant cash flows as Example 9-6, the NPV using a 7% discount rate is as follows:

Period	Net Cash Flow	7% PV Factor	Discounted Cash Flows
Initial Investment	$(501,000)	1.00000	$(501,000)
Year 1	77,000	0.93458	71,963
Year 2	77,000	0.87344	67,255
Year 3	77,000	0.81630	62,855
Year 4	77,000	0.76290	58,743
Year 5	85,000	0.71299	60,604
Year 6	85,000	0.66634	56,639
Year 7	85,000	0.62275	52,934
Year 8	101,800	0.58201	59,249
Net Present Value			**$ (10,758)**

The higher discount rate (6% to 7%) causes the NPV to become negative. Thus, the IRR of this project is somewhere around 6.5%.

Because the company's desired rate of return is 6%, the project should be accepted, the same decision that was arrived at using the net present value method.

5. **Disadvantages of IRR**

   a. IRR used in isolation is seldom the best route to a sound capital budgeting decision. The following factors reduce the usefulness of IRR:

      1) **Direction of cash flows.** When the direction of the cash flows changes, focusing simply on IRR can be misleading.

EXAMPLE 9-8 IRR -- Direction of Cash Flows

Below are the net cash flows for two potential capital projects:

	Initial	Period 1
Project X	$(222,240)	$240,000
Project Y	222,240	(240,000)

The cash flow amounts are the same in absolute value, but the directions differ. In choosing between the two, a decision maker might be tempted to select the project that has a cash inflow earlier and a cash outflow later.

The IRR for both projects is 8%, which can be proved as follows:

Project X				Project Y			
$(222,240)	× 1.000	=	$(222,240)	$222,240	× 1.000	=	$ 222,240
240,000	× 0.926	=	222,240	(240,000)	× 0.926	=	(222,240)
			$ 0				**$ 0**

Discounting the cash flows at the company's hurdle rate of 6% reveals a different picture.

Project X				Project Y			
$(222,240)	× 1.000	=	$(222,240)	$222,240	× 1.000	=	$ 222,240
240,000	× 0.943	=	226,320	(240,000)	× 0.943	=	(226,320)
			$ 4,080				**$ (4,080)**

It turns out that, given a hurdle rate lower than the rate at which the two projects have the same return, the project with the positive cash flow earlier is by far the less desirable of the two.

Clearly, a decision maker can be seriously misled if (s)he uses the simple direction of the cash flows as the tiebreaker when two projects have the same IRR.

      a) An investment will have multiple IRRs if the direction of net cash flows changes.

         i) This effect is known as the multiple IRR problem. Thus, the NPV method is preferable when the direction of cash flows varies from year to year.

      2) **Mutually exclusive projects.** As with changing cash flow directions, focusing only on IRR when capital is limited can lead to unsound decisions.

EXAMPLE 9-9 IRR -- Mutually Exclusive Projects

Below are the cash flows for two potential capital projects:

	Initial	Period 1	IRR
Project S	$(178,571)	$ 200,000	12%
Project T	(300,000)	330,000	10%

If capital is available for only one project, using IRR alone would suggest that Project S be selected.

Once again, however, discounting both projects' net cash flows at the company's hurdle rate suggests a different decision.

Project S				Project T			
$(178,571)	× 1.000	=	$(178,571)	$(300,000)	× 1.000	=	$(300,000)
200,000	× 0.943	=	188,600	330,000	× 0.943	=	311,190
			$ 10,029				**$ 11,190**

While Project S has the distinction of giving the company a higher IRR, Project T is in fact preferable because it adds more to shareholder value.

3) **Varying rates of return.** A project's NPV can easily be determined using different desired rates of return for different periods. The IRR is limited to a single summary rate for the entire project.

4) **Multiple investments.** NPV amounts from different projects can be added, but IRR rates cannot. The IRR for the whole is not the sum of the IRRs for the parts.

6. **Comparing Cash Flow Patterns**

a. Often a decision maker must choose between two mutually exclusive projects, one whose inflows are higher in the early years but fall off drastically later and one whose inflows are steady throughout the project's life.

1) The higher a firm's hurdle rate, the more quickly a project must pay off.
2) Firms with low hurdle rates prefer a slow and steady payback.

b. EXAMPLE: Consider the net cash flows of the following two projects:

	Initial	Year 1	Year 2	Year 3	Year 4
Project K	$(200,000)	$140,000	$100,000	–	–
Project L	(200,000)	65,000	65,000	$65,000	$65,000

1) A graphical representation of the two projects at various discount rates helps to illustrate the factors a decision maker must consider in such a situation.

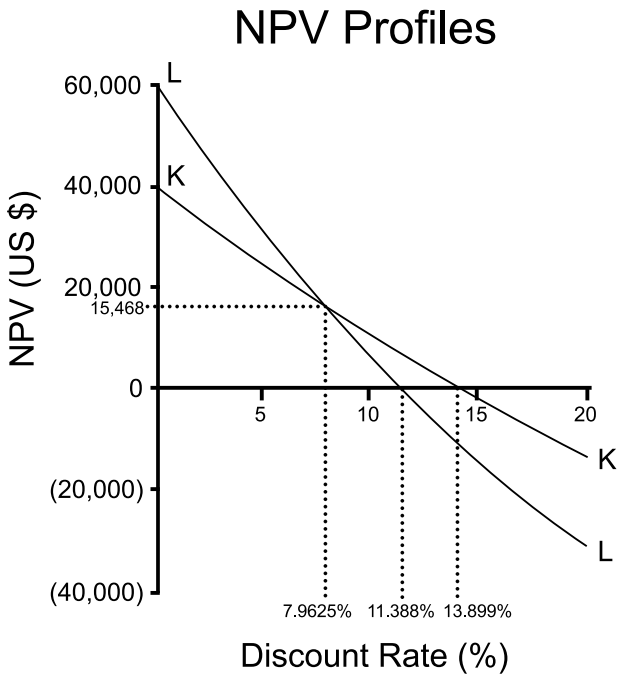


Figure 9-1

c. The NPV profile can be of great practical use to managers trying to make investment decisions. It gives the manager a clear insight into the following questions:

1) How sensitive is a project's profitability to changes in the discount rate?

a) At a hurdle rate of exactly 7.9625%, a decision maker is indifferent between the two projects. The net present value of both is $15,468 at that discount rate.

b) At hurdle rates below 7.9625%, the project whose inflows last longer into the future is the better investment (L).

c) At hurdle rates above 7.9625%, the project whose inflows are "front-loaded" is the better choice (K).

2) At what discount rates is an investment project still a profitable opportunity?

a) At any hurdle rate above 13.899%, Project K loses money. This is its IRR, i.e., the rate at which its NPV = $0 (Project L's is 11.388%).

7. **Comparing NPV and IRR**

   a. The reinvestment rate becomes critical when choosing between the NPV and IRR methods. NPV assumes the cash flows from the investment can be reinvested at the project's discount rate, that is, the desired rate of return (generally, the company's cost of capital rate).

   b. The NPV and IRR methods give the same accept/reject decision if projects are independent. Independent projects have unrelated cash flows. Hence, all acceptable independent projects can be undertaken.

   c. If one of two or more mutually exclusive projects is accepted, the others must be rejected.

      1) The NPV and IRR methods may rank mutually exclusive projects differently if

         a) The cost of one project is greater than the cost of another.

         b) The timing, amounts, and directions of cash flows differ among projects.

         c) The projects have different useful lives.

         d) The cost of capital or desired rate of return varies over the life of a project. The NPV can easily be determined using different desired rates of return for different periods. The IRR determines one rate for the project.

         e) Multiple investments are involved in a project. NPV amounts are addable, but IRR rates are not. The IRR for the whole is not the sum of the IRRs for the parts.

      2) The IRR method assumes that the cash flows will be reinvested at the internal rate of return.

         a) If the project's funds are not reinvested at the IRR, the ranking calculations obtained may be in error.

         b) The NPV method gives a better grasp of the problem in many decision situations because the reinvestment is assumed to be in the desired rate of return.

EXAMPLE 9-10 NPV vs. IRR

Project	Initial Cost	Year-End Cash Flow	IRR	NPV (k = 10%)
A	$1,000	$1,200	20%	$91
B	$ 50	$ 100	100%	$41

- IRR preference ordering: B, A
- NPV preference ordering: A, B
- When choosing between mutually exclusive projects, the ranking differences between NPV and IRR become very important. In the example, a firm using IRR would accept B and reject A. A firm using NPV would make exactly the opposite choice.

   d. NPV and IRR are the soundest investment rules from a shareholder wealth maximization perspective.

e. The problem can be seen more clearly using a net present value profile. The NPV profile is a plot of a project's NPV at different discount rates. The NPV is plotted on the vertical axis and the rate of return (k) on the horizontal axis.

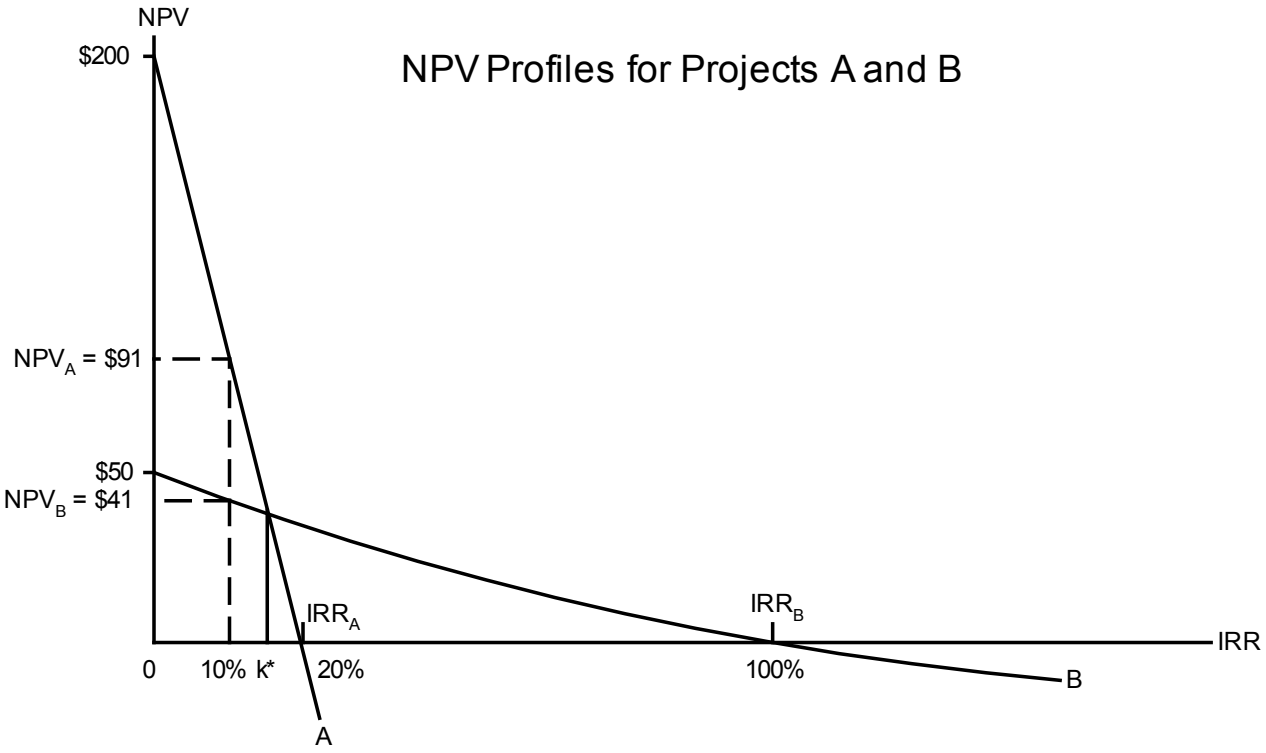


Figure 9-2

f. The manager concerned with shareholder wealth maximization should choose the project with the greatest NPV, not the largest IRR.

1) IRR is a percentage measure of wealth, but NPV is an absolute measure.

9.4 PAYBACK AND DISCOUNTED PAYBACK

1. The traditional **payback period** is the number of years required to return the original investment, that is, the time necessary for a new asset to pay for itself. Note that no accounting is made for the time value of money under this method.
   a. Companies using the payback method set a maximum length of time within which projects must pay for themselves to be considered acceptable.
   b. **If the cash flows are constant**, the formula is

$$\text{Payback period} = \frac{\text{Initial net investment}}{\text{Annual expected cash flow}}$$

      1) EXAMPLE: A project is being considered that will require an outlay of $200,000 immediately and will return a steady cash flow of $52,000 for the next 4 years. The company requires a 4-year payback period on all capital projects.
         a) Payback period = $200,000 ÷ $52,000 = 3.846 years
         b) The project's payback period is less than the company's maximum, and the project is thus acceptable.
   c. **If the cash flows are not constant**, the calculation must be in cumulative form.
      1) EXAMPLE: Instead of the smooth inflows predicted above, the project's cash stream is expected to vary. The payback period is calculated as follows:

End of Year	Cash Inflow	Remaining Initial Investment
Year 0	$ 0	$200,000
Year 1	48,000	152,000
Year 2	54,000	98,000
Year 3	54,000	44,000
Year 4	42,000	2,000

         a) At the end of 4 years, the original investment has still not been recovered, so the project is rejected.
   d. The advantage of the payback method is its simplicity.
      1) To some extent, the payback period measures risk. The longer the period, the more risky the investment.
      2) The payback method provides a rough indication of a project's liquidity. The longer the period, the less liquid the investment.
   e. The disadvantages of the payback method include
      1) Disregarding all cash inflows after the payback cutoff date.
      2) Disregarding the time value of money. Weighting all cash inflows equally ignores the fact that money has a cost.

2. The **discounted payback method**, also called breakeven time, is sometimes used to overcome the second disadvantage (on the previous page) of the basic payback method.
   a. The net cash flows in the denominator are discounted to calculate the period required to recover the initial investment.

Period	Cash Inflow	6% PV Factor	Discounted Cash Flow	Remaining Initial Investment
Initial Investment	$ 0	1.00000	$ 0	$200,000
Year 1	48,000	0.94340	45,283	154,717
Year 2	54,000	0.89000	48,060	106,657
Year 3	54,000	0.83962	45,339	61,318
Year 4	42,000	0.79209	33,268	28,050

      1) After 4 years, the project is much further from paying off than under the basic method.
      2) Clearly then, this is a **more conservative** technique than the traditional payback method.

   b. The discounted payback method's advantage is that it acknowledges the time value of money.
      1) Its disadvantages are that it loses the simplicity of the basic payback method and still ignores cash flows after the arbitrary cutoff date.

   c. The discounted payback method can also be used to calculate the **breakeven time**, which is the period required for the discounted cumulative cash inflows on a project to equal the discounted cumulative cash outflows (usually but not always the initial cost).
      1) Thus, it is the time necessary for the present value of the discounted cash flows to equal zero. This period begins at the outset of a project, not when the initial cash outflow occurs.

3. **Other Payback Methods**
   a. The **bailout payback method** incorporates the salvage value of the asset into the calculation. It measures the length of the payback period when the periodic cash inflows are combined with the salvage value.
   b. The **payback reciprocal** (1 ÷ Payback) is sometimes used as an estimate of the internal rate of return.

9.5 RANKING INVESTMENT PROJECTS

1. **Capital rationing** exists when a firm sets a limit on the amount of funds to be invested during a given period. In such situations, a firm cannot afford to undertake all profitable projects.
   a. Another way of stating this is that the firm cannot invest the entire amount needed to fund its theoretically optimal capital budget.
      1) Only those projects that will return the greatest NPV for the limited capital available in the internal capital market can be undertaken.
   b. Reasons for capital rationing include
      1) A lack of nonmonetary resources (e.g., managerial or technical personnel)
      2) A desire to control estimation bias (overly favorable projections of a project's cash flows)
      3) An unwillingness to issue new equity (e.g., because of its cost or a reluctance to reveal data in regulatory filings)
2. The **profitability index** (or excess present value index) is a method for ranking projects to ensure that limited resources are placed with the investments that will return the highest NPV per dollar invested.

$$\text{Profitability index} = \frac{\text{PV of future cash flows}}{\text{Net investment}}$$

   a. If the profitability index is **greater than 1**, the project should be accepted.
      1) If the profitability index is greater than 1, the required rate of return must be less than the IRR.
   b. If the profitability index is **less than 1**, the project should be rejected.
      1) If the profitability index is less than 1, the required rate of return must be higher than the IRR.
   c. EXAMPLE: A company has $200,000 to invest. It can therefore either invest in Project F or in Projects G and H.

	Initial	Year 1	Year 2	Year 3	Year 4
Project F	$(200,000)	$140,000	$100,000	-	-
Project G	(88,950)	30,000	30,000	$30,000	$30,000
Project H	(88,440)	30,000	28,000	28,000	34,000

      1) Discounting each project at 6% results in the following:

	NPV	Divided by: Initial Investment	Equals: Profitability Index
Project F	$21,020	$200,000	0.105
Project G	15,000	88,950	0.169
Project H	15,218	88,440	0.172

      2) In an environment of capital rationing, the company can see that it should invest first in Project H, then in Project G, and, if new funding is found, last in Project F.

NOTE: On the CMA exam, the numerator of the profitability index may be calculated in one of two ways: (1) as the net present value of all cash flows or (2) as the present value only of cash inflows. If the net of all cash flows is used, the profitability index will be less than 1. If only the future net cash inflows are used, that is, if the initial investment is excluded, the profitability index will be greater than 1. The calculation of the numerator does not affect the choice of the most profitable project.

d. The NPV method and profitability index result in the same project selection.

3. **Internal capital market** is a way of referring to the provision of funds by one division of a firm to another division. A division operating in a mature industry that generates a lot of cash can provide funding to another division that is in the cash-hungry development stage.
   a. An advantage is the avoidance of stock issue costs or interest costs on new debt.
   b. A disadvantage is that calling it a “market” is somewhat misleading. The dynamics of the process are more akin to centralized planning and budgeting than to the workings of a free marketplace.
4. **Linear programming** is a technique (now usually computerized) for optimizing resource allocations so as to select the most profitable or least costly way to use available resources.
   a. It involves optimizing an objective function subject to the net of constraint equations.
   b. For example, a linear programming application can maximize NPV for a group of projects in a capital rationing situation (expenditure constraint).

9.6 COMPREHENSIVE EXAMPLES OF INVESTMENT DECISIONS

CMA candidates will be expected to have an understanding of how to calculate net present value (NPV) and internal rate of return (IRR) as well as be able to identify the criteria used to compare, evaluate, and recommend capital projects. You should also have an understanding of how these methods are affected by independent versus mutually exclusive projects. Pay close attention to the requirements to recognize whether the projects are independent.

The two comprehensive examples in this subunit demonstrate the calculations for NPV, IRR, payback period, and the profitability index. Review these examples and then practice answering questions and test yourself on how these problems will be presented on the exam in both multiple-choice and essay questions. If you receive an essay question with a scenario requiring you to provide any or all of these calculations, be prepared to show your work in the answer box utilizing the word processing tools.

EXAMPLE 9-11 NPV, IRR, Payback, PI

Hazman Company plans to replace an old piece of equipment that is obsolete and expected to be unreliable under the stress of daily operations. The equipment is fully depreciated, and no salvage value can be realized upon its disposal. One piece of equipment being considered as a replacement will provide an annual cash savings of $7,000 before income taxes and without regard to the effect of depreciation. The equipment costs $18,000 and has an estimated useful life of 5 years. No salvage value will be used for depreciation purposes because the equipment is expected to have no value at the end of 5 years.

Hazman uses the straight-line depreciation method on all equipment for both book and tax purposes. Hence, annual depreciation is $3,600. The company is subject to a 40% tax rate. Hazman's desired rate of return is 14%, so it will use the 14% column from a present value table.

Analysis of cash flows:

Annual cash savings	$ 7,000	
Less: Income taxes (40%)	(2,800)	
After-tax cash savings		$4,200
Historical cost of equipment	$18,000	
Divided by: Useful life	÷ 5	
Annual depreciation	$ 3,600	
Times: Tax rate	× 40%	
Depreciation tax shield		1,440
Annual after-tax cash inflows		$5,640

Net present value = (After-tax cash flows × Present value of an annuity) – Net investment
= ($5,640 × 3.43) – $18,000
= $19,345 – $18,000
= $1,345

Internal rate of return. The goal is to find the discount rate that most nearly equals the net investment.

Net present value at 16% ($5,640 × 3.27)	$ 18,443
Net present value at 18% ($5,640 × 3.13)	(17,653)
Difference	$ 790
Net present value at 16%:	$ 18,443
Initial investment	(18,000)
Difference	$ 443
Estimated increment [($443 ÷ $790) × 2%]	1.1%
Rate used	+ 16.0%
Internal rate of return	17.1%

Payback period = Net investment ÷ After-tax cash flow
= $18,000 ÷ $5,640
= 3.19 years

Profitability index (PI) = PV of future cash flows ÷ Net investment
= ($5,640 × 3.43) ÷ $18,000
= $19,345 ÷ $18,000
= 1.07

EXAMPLE 9-12 NPV, IRR, Payback, PI

The management of Flesher Farms is trying to decide whether to buy a new team of mules at a cost of $1,000 or a new tractor at a cost of $10,000. They will perform the same job. But because the mules require more laborers, the annual return is only $250 of net cash inflows. The tractor will return $2,000 of net cash inflows per year. The mules have a working life of 8 years, and the tractor has a working life of 10 years. Neither investment is expected to have a salvage value at the end of its useful life. Flesher Farms' desired rate of return is 6%.

Net Present Value

	Mules	Tractor
Net cash inflows	$ 250	$ 2,000
Times: Present value factor	6.210	7.360
Present value	$1,553	$14,720
Minus: Initial investment	(1,000)	(10,000)
Net present value	$ 553	$ 4,720

Internal Rate of Return

Mules: Initial investment ÷ Net cash inflows = $1,000 ÷ $250 = 4

On the 8-year line, a factor of 4 indicates a rate of return of approximately 18.7%.

Tractor: Initial investment ÷ Net cash inflows = $10,000 ÷ $2,000 = 5

On the 10-year line, a factor of 5 indicates a rate of return of approximately 15.2%.

Payback Period

Mules: Initial investment ÷ Net cash inflows = $1,000 ÷ $250 = 4 years

Tractor: Initial investment ÷ Net cash inflows = $10,000 ÷ $2,000 = 5 years

Profitability Index (PI)

Mules: Present value of cash inflows ÷ Initial investment = $1,553 ÷ $1,000
= 1.553

Tractor: Present value of cash inflows ÷ Initial investment = $14,720 ÷ $10,000
= 1.472

The mule investment has the higher IRR, the quicker payback, and the better profitability index. However, the tractor has the better net present value. The various methods thus give different answers to the investment question. Either investment will be profitable. Management may decide to let noneconomic factors influence the decision. For example, the mules will require the use of more laborers. If unemployment in the community is high, management might wish to achieve a social goal of providing more jobs. Alternatively, a labor shortage might convince management to buy the tractor to reduce labor worries.

STUDY UNIT TEN

CVP ANALYSIS

This study unit is the **first of two** on **decision analysis**. The relative weight assigned to this major topic in Part 2 of the exam is **25%**. The two study units are

Study Unit 10: CVP Analysis
Study Unit 11: Marginal Analysis and Pricing

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

10.1 SHORT-RUN PROFIT MAXIMIZATION

1. Marginal Revenue and Marginal Cost

a. Marginal revenue is the additional (incremental) revenue produced by generating one more unit of output. It is the difference in total revenue at each level of output.

1) **Marginal product** is the incremental output obtained by adding one unit of a variable input factor.

2) While total revenue keeps increasing with the sale of additional units, it increases by ever smaller amounts. This is reflected in a constantly decreasing marginal revenue.

3) EXAMPLE: A company has the following revenue data for one of its products:

Units of Output		Unit Price		Total Revenue	Marginal Revenue
1	×	$580	=	$ 580	$580
2	×	575	=	1,150	570
3	×	570	=	1,710	560
4	×	565	=	2,260	550
5	×	560	=	2,800	540
6	×	555	=	3,330	530
7	×	550	=	3,850	520
8	×	545	=	4,360	510
9	×	540	=	4,860	500
10	×	535	=	5,350	490
11	×	530	=	5,830	480
12	×	525	=	6,300	470

a) Revenue by itself cannot determine the proper level of output. Cost data must also be considered.

b. Marginal cost is the additional (also called incremental) cost incurred by generating one additional unit of output. Mathematically, it is the difference in total cost at each level of output.

1) Typically, unit cost decreases for a while as the process becomes more efficient. Past a certain point, however, the process becomes less efficient and unit cost increases.

a) Thus, while total cost increases gradually for a while, at some point it begins to increase sharply. This is reflected in a decreasing, then increasing, marginal cost.

2) EXAMPLE: A company has the following cost data for the product (for simplicity, each unit of output requires exactly one unit of input):

Units of Output	Unit Cost	Total Cost	Marginal Cost
1	$570	$ 570	$570
2	405	810	240
3	340	1,020	210
4	305	1,220	200
5	287	1,435	215
6	279	1,675	240
7	279	1,955	280
8	284	2,275	320
9	295	2,655	380
10	310	3,095	440
11	327	3,595	500
12	347	4,165	570

2. **Profit Maximization**

a. The firm's goal is to maximize profits, not revenues. Thus, marginal revenue data must be compared with marginal cost data to determine the point of profit maximization.

1) Profit is maximized at the output level where marginal revenue equals marginal cost.

Profit Maximization
Marginal revenue = Marginal cost

a) Beyond this point, increasing production results in a level of costs so high that the total profit is diminished.

2) EXAMPLE: Comparing its marginal revenue and marginal cost data allows the company to determine the point of profit maximization.

Units of	Marginal				Total			
Output	Revenue		Cost	Profit	Revenue		Cost	Profit
1	$580	–	$570	= $ 10	$ 580	–	$ 570	= $ 10
2	570	–	240	= 330	1,150	–	810	= 340
3	560	–	210	= 350	1,710	–	1,020	= 690
4	550	–	200	= 350	2,260	–	1,220	= 1,040
5	540	–	215	= 325	2,800	–	1,435	= 1,365
6	530	–	240	= 290	3,330	–	1,675	= 1,655
7	520	–	280	= 240	3,850	–	1,955	= 1,895
8	510	–	320	= 190	4,360	–	2,275	= 2,085
9	500	–	380	= 120	4,860	–	2,655	= 2,205
10	**490**	**–**	**440**	**= 50**	**5,350**	**–**	**3,095**	**= 2,255**
11	480	–	500	= (20)	5,830	–	3,595	= 2,235
12	470	–	570	= (100)	6,300	–	4,165	= 2,135

a) Beyond the output level of 10 units, marginal profit turns negative. Note that this is, by definition, the point of highest total profit.

3. **Short-Run Cost Relationships**

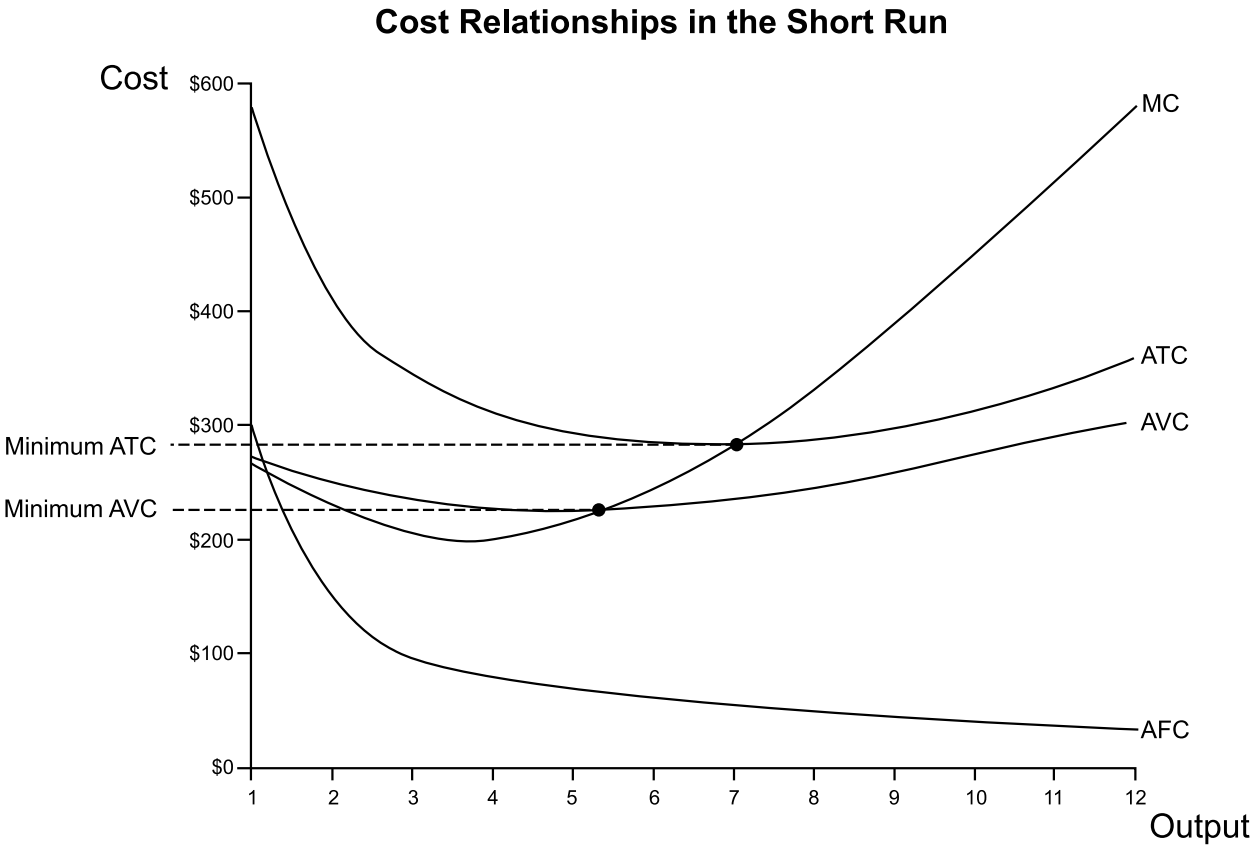
a. To make marginal analysis meaningful, total cost must be broken down into its fixed and variable components.

1) EXAMPLE: Cost analysis reveals that the inputs to the company's process have the following cost structure:

Units of	Total Costs		Fixed Costs		Variable Costs	
Output	In Total	Average	In Total	Average	In Total	Average
1	$ 570	$570	$300	$300	$ 270	$270
2	810	405	300	150	510	255
3	1,020	340	300	100	720	240
4	1,220	305	300	75	920	230
5	1,435	287	300	60	1,135	227
6	1,675	279	300	50	1,375	229
7	1,955	279	300	43	1,655	236
8	2,275	284	300	38	1,975	247
9	2,655	295	300	33	2,355	262
10	3,095	310	300	30	2,795	280
11	3,595	327	300	27	3,295	300
12	4,165	347	300	25	3,865	322

b. These relationships can be depicted graphically as follows:

Legend
MC = marginal cost
ATC = average total cost
AVC = average variable cost
AFC = average fixed cost



Cost Relationships in the Short Run

Figure 10-1

1) Average fixed cost (AFC) declines for as long as production increases. This is because the fixed amount of cost is being spread over more and more units.
   a) AFC is thus an asymptotic function, always approaching the x axis without ever intersecting with it.
2) Average variable cost (AVC) declines quickly and then gradually begins increasing.
   a) AVC is at its lowest where MC crosses it, between 5 and 6 units. This is confirmed by reference to the data in the tables (MC: $215-$240, AVC: $227-$229).
3) Average total cost (ATC) behaves similarly. It declines rapidly and then begins a gradual increase.
   a) ATC also reaches its minimum at the point where MC crosses it, just after 7 units (MC: $280, AVC: $279).
4) As a general statement, ATC = AFC + AVC.
   a) Thus, the distance between the ATC and AVC curves is always the same as the distance between the AFC curve and the x axis.

4. **Pure Competition**

   a. A purely competitive market is characterized by a large number of buyers and sellers acting independently and a homogeneous or standardized product (e.g., agricultural commodities).

      1) Marginal revenue equals price.
      2) EXAMPLE: A firm in pure competition has the following revenue data:

Units of Output		Unit Price (Average Revenue)		Total Revenue	Marginal Revenue
1	×	$960	=	$ 960	$960
2	×	960	=	1,920	960
3	×	960	=	2,880	960
4	×	960	=	3,840	960
5	×	960	=	4,800	960
6	×	960	=	5,760	960
7	×	960	=	6,720	960
8	×	960	=	7,680	960

   b. The following graph depicts the relationships among total revenue (TR), average revenue (AR), and marginal revenue (MR) for a firm in pure competition.

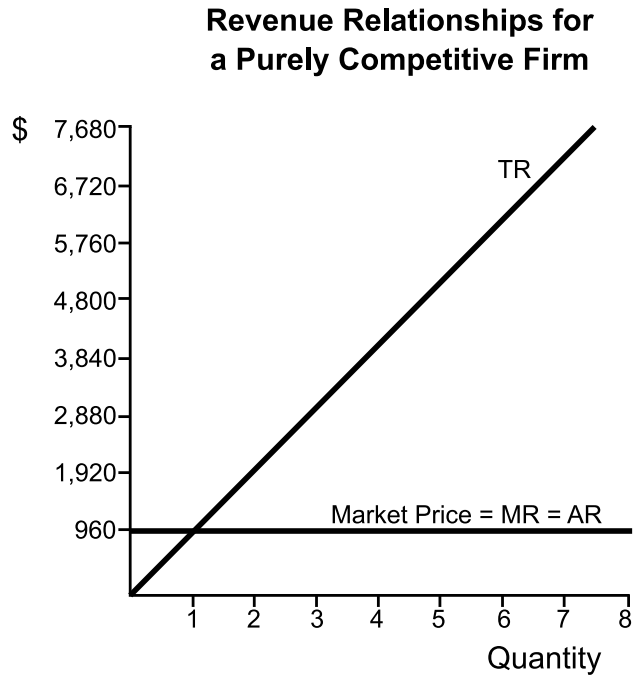


Figure 10-2

      1) TR is a straight line with a constant positive slope. The price, MR, and AR curves are identical.

c. As noted in item 2.a.1), short-run profit maximization is achieved when marginal revenue equals marginal cost. As long as the next unit of output adds more in revenue (MR) than in cost (MC), the firm will increase total profit or decrease total losses.

1) For a purely competitive firm, price = MC is the same as MR = MC.

2) EXAMPLE: The firm has performed the following marginal analysis:

Units of Output	Revenue		Cost		Profit	
	Total	Marginal	Total	Marginal	Total	Marginal
1	$ 960	$960	$1,800	$1,800	$(840)	$(840)
2	1,920	960	2,500	700	(580)	260
3	2,880	960	3,100	600	(220)	360
4	3,840	960	3,600	500	240	460
5	4,800	960	4,200	600	600	360
6	5,760	960	5,080	880	680	80
7	**6,720**	**960**	**6,040**	**960**	**680**	**0**
8	7,680	960	7,160	1,120	520	(160)

3) The following graph depicts the short-run profit-maximizing quantity for a firm in pure competition (a “price taker”):

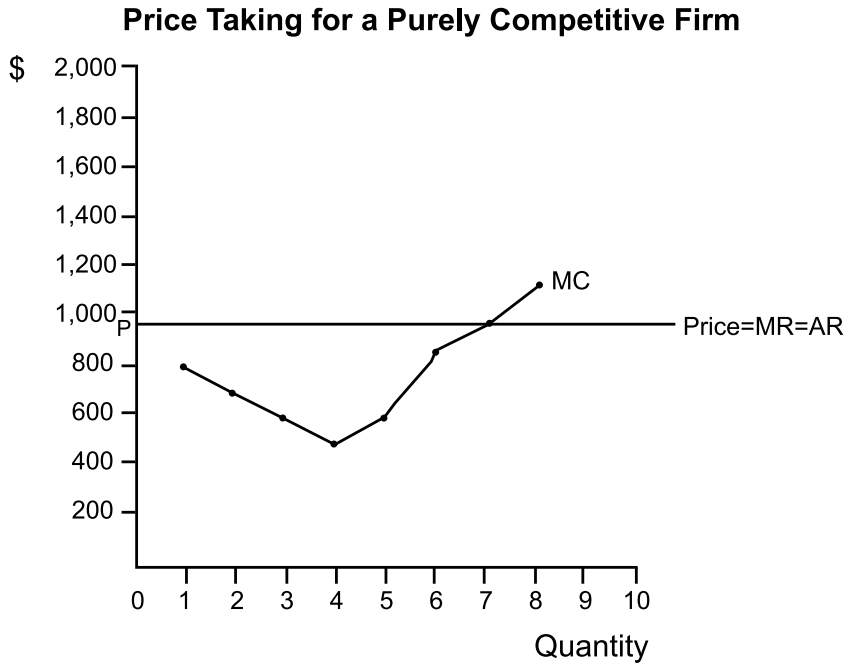


Figure 10-3

a) Being in a purely competitive industry, the firm has no choice but to find its price along the horizontal MR curve.

b) The profit-maximizing quantity to produce is found at the point where the MC curve crosses MR.

c) Point A reveals a quantity of 7 units. This is confirmed by consulting the table and verifying that at an output of 7, MR = MC.

5. **Monopoly**

   a. In a monopoly market, the industry consists of one firm and the product has no close substitutes.

      1) Marginal revenue is less than price.

      2) To increase sales of its product, a monopolist generally must lower its price.

      3) Thus, a monopolist's marginal revenue continuously decreases as it raises output. Past the point where MR = $0, the monopolist's total revenue begins to decrease.

Units of Output		Unit Price (Average Revenue)		Total Revenue	Marginal Revenue
1	×	$960	=	$ 960	$960
2	×	910	=	1,820	860
3	×	860	=	2,580	760
4	×	810	=	3,240	660
5	×	760	=	3,800	560
6	×	710	=	4,260	460
7	×	660	=	4,620	360
8	×	610	=	4,880	260

      4) The monopolist has the power to set output at the level where profits are maximized, that is, where **MR = MC**. This is called "price searching."

Price Searching for a Monopolist

Units of Output	Revenue		Cost		Profit	
	Total	Marginal	Total	Marginal	Total	Marginal
1	$ 960	$960	$ 800	$ 800	$ 160	$ 160
2	1,820	860	1,480	680	340	180
3	2,580	760	1,980	500	600	260
4	3,240	660	2,320	340	920	320
5	**3,800**	**560**	**2,800**	**480**	**1,000**	**80**
6	4,260	460	3,480	680	780	(220)
7	4,620	360	4,620	1,140	0	(780)
8	4,880	260	5,920	1,300	(1,040)	(1,040)

         a) Profit is maximized at an output of 5 units.

6. **Monopolistic Competition**

   a. An industry in monopolistic competition has a large number of firms that produce differentiated products. The number is fewer than in pure competition, but it is great enough that firms cannot collude. That is, they cannot act together to restrict output and fix the price.

      1) To maximize profits (or minimize losses) in the short run or long run, a firm in monopolistic competition produces at the level of output at which MR = MC.

7. **Oligopoly**

   a. An oligopoly is an industry with a few large firms. Firms operating in an oligopoly are mutually aware and mutually interdependent. Their decisions as to price, advertising, etc., are to a very large extent dependent on the actions of the other firms.

      1) Prices tend to be rigid (sticky) because of the interdependence among firms.

      2) For example, if one oligopolist lowers prices, sales will not increase because the other firms will lower prices. As a result, profits in the industry will decline because of the lower prices.

10.2 COST-VOLUME-PROFIT (CVP) ANALYSIS -- THEORY

1. **Purpose**

   a. Also called **breakeven analysis**, CVP analysis is a tool for understanding the interaction of revenues with fixed and variable costs.

      1) It illuminates how changes in assumptions about cost behavior and the relevant ranges (defined in CMA Part 1 in Study Unit 5, Subunit 2) in which those assumptions are valid may affect the relationships among revenues, variable costs, and fixed costs at various production levels.

      2) Thus, CVP analysis allows management to discern the probable effects of changes in sales volume, sales price, product mix, etc.

   b. The **breakeven point** is the level of output at which total revenues equal total expenses.

      1) It is the point at which all fixed costs have been covered and operating income is zero.

      2) CVP analysis is used not only for planning but also to assist in determining whether to accept a special order.

2. **Assumptions of CVP**

   a. Cost and revenue relationships are predictable and linear. These relationships are true over the relevant range of activity and specified time span.

   b. Unit selling prices do not change.

   c. Inventory levels do not change; i.e., production equals sales.

   d. Total **variable costs** change proportionally with volume, but unit variable costs do not change.

   e. **Fixed costs** remain constant over the relevant range of volume, but unit fixed costs vary indirectly with volume.

   f. The relevant range of volume may vary based on the time frame (e.g., operating period) being considered. Therefore, the classification of fixed and variable costs may vary each time frame.

   g. The revenue (sales) mix does not change.

   h. The time value of money is ignored.

3. A managerial accountant is not limited to the CVP assumptions in item 2. on the previous page. Alternative planning assumptions may be derived from **sensitivity analysis**.
   a. This process observes the effects on a mathematical model when the input parameters change. Thus, if the trade-off between fixed and variable costs has not yet been decided, CVP analysis can be computed multiple times to determine the effects of various options.
4. **Breakeven Point for a Single Product**
   a. The breakeven point can be calculated in units and in sales dollars.
      1) The simplest calculation for breakeven **in units** is to divide fixed costs by the unit contribution margin (UCM).

$$\text{UCM} = \text{Unit sales price} - \text{Unit variable cost}$$

$$\text{Breakeven point in units} = \frac{\text{Fixed costs}}{\text{UCM}}$$

      2) The breakeven point **in sales dollars** equals fixed costs divided by the contribution margin ratio (CMR).

$$\text{CMR} = \frac{\text{UCM}}{\text{Unit selling price}}$$

$$\text{Breakeven point in dollars} = \frac{\text{Fixed costs}}{\text{CMR}}$$

EXAMPLE 10-1 BEP -- One Product

A manufacturer's product has a unit sales price of $0.60 and a unit variable cost of $0.20. Fixed costs are $10,000.

Unit selling price	$0.60
Minus: Unit variable costs	(0.20)
Unit contribution margin (UCM)	$0.40

Breakeven point in units = Fixed costs ÷ UCM
= $10,000 ÷ $0.40
= 25,000 units

The manufacturer's contribution margin ratio is 66.667% ($0.40 ÷ $0.60).

Breakeven point in dollars = Fixed costs ÷ CMR
= $10,000 ÷ .66667
= $15,000

5. **Margin of Safety**

   a. The margin of safety is the excess of budgeted sales over breakeven sales.

      1) It is the amount by which sales can decline before losses occur.

$$\text{Margin of safety} = \text{Planned sales} - \text{Breakeven sales}$$

      2) The **margin of safety ratio** shows the percent by which sales can decline before the breakeven point is reached.

$$\text{Margin of safety ratio} = \frac{\text{Margin of safety}}{\text{Planned sales}}$$

EXAMPLE 10-2 Margin of Safety

In units:

Margin of safety = Planned sales – Breakeven sales
= 35,000 – 25,000
= 10,000 units

$$\text{Margin of safety ratio} = \frac{\text{Margin of safety}}{\text{Planned sales}} = \frac{10{,}000}{35{,}000} = 28.6\%$$

In dollars:

Margin of safety = Planned sales – Breakeven sales
= (35,000 units × $0.60) – $15,000
= $21,000 – $15,000
= $6,000

$$\text{Margin of safety ratio} = \frac{\text{Margin of safety}}{\text{Planned sales}} = \frac{\$6{,}000}{\$21{,}000} = 28.6\%$$

10.3 CVP ANALYSIS -- BASIC CALCULATIONS

The ability to apply the mathematical principles of breakeven analysis quickly is a crucial skill on Part 2 of the CMA exam. This subunit consists entirely of questions that "drill" the candidate on this ability. Please review Subunit 10.2 before attempting to answer the questions in this subunit.

10.4 CVP ANALYSIS -- TARGET INCOME CALCULATIONS

1. **Target Operating Income**

   a. An amount of operating income, either in dollars or as a percentage of sales, is frequently required.

      1) By treating target income as an additional fixed cost, CVP analysis can be applied.

$$\text{Target income in units} = \frac{\text{Fixed costs} + \text{Target operating income}}{\text{UCM}}$$

EXAMPLE 10-3 Target Unit Volume

The manufacturer from the previous example with the $0.40 contribution margin per unit wants to find out how many units must be sold to generate $25,000 of operating income.

Target unit volume = (Fixed costs + Target operating income) ÷ UCM
= ($10,000 + $25,000) ÷ $0.40
= $35,000 ÷ $0.40
= 87,500 units

2. **Target Net Income**

   a. A variation of this problem asks for net income (an after-tax amount) instead of operating income (a pretax amount).

$$\text{Target income in units} = \frac{\text{Fixed costs} + [\text{Target net income} \div (1.0 - \text{tax rate})]}{\text{UCM}}$$

      1) EXAMPLE: The manufacturer wants to generate $30,000 of net income. The effective tax rate is 40%.

Target unit volume = {Fixed costs + [Target net income ÷ (1.0 – .40)]} ÷ UCM
= [$10,000 + ($30,000 ÷ .60)] ÷ $.40
= 150,000 units

3. **Other Target Income Situations**

   a. Other target income situations call for the application of the standard formula for operating income.

Operating income = Sales – Variable costs – Fixed costs

EXAMPLE 10-4 Target Operating Income

If units are sold at $6.00 and variable costs are $2.00, how many units must be sold to realize operating income of 15% ($6.00 × .15 = $.90 per unit) before taxes, given fixed costs of $37,500?

Operating income = Sales – Variable costs – Fixed costs
$0.90 × Q = ($6.00 × Q) – ($2.00 × Q) – $37,500
$3.10 × Q = $37,500
Q = 12,097 units

Selling 12,097 units results in $72,582 of revenues. Variable costs are $24,194, and operating income is $10,888 ($72,582 × 15%). The proof is that variable costs of $24,194, plus fixed costs of $37,500, plus operating income of $10,888, equals $72,582 of sales.

b. The operating income formula can also be used in the following situation:

EXAMPLE 10-5 After-Tax Target Net Income

If variable costs are $1.20, fixed costs are $10,000, and selling price is $2, and the company targets a $5,000 after-tax profit when the tax rate is 30%, the calculation is as follows:

$$\begin{aligned} \$\ 2Q &= [\$5{,}000 \div (1.0 - 0.3)] + \$1.20Q + \$10{,}000 \\ \$.8Q &= \$7{,}142.86 + \$10{,}000 \\ \$.8Q &= \$17{,}142.86 \\ Q &= \$17{,}142.86 \div .8 \\ Q &= 21{,}428.575 \text{ units} \end{aligned}$$

If the company plans to sell 21,429 units at $2 each, revenue will be $42,858. The following is the pro forma income statement for the target net income:

Sales (21,429 × $2)	$ 42,858
Less: Variable costs (21,429 × $1.20)	(25,715)
Contribution margin	$ 17,143
Less: Fixed costs	(10,000)
Operating income	$ 7,143
Income taxes (30%)	(2,143)
Net income	$ 5,000

10.5 CVP ANALYSIS -- MULTI-PRODUCT CALCULATIONS

1. **Multiple Products (or Services)**

a. A multi-product breakeven point in units can be calculated as follows:

$$\text{Multi-product breakeven point} = \frac{\text{Total fixed costs}}{\text{Weighted-average selling price} - \text{Weighted-average variable cost}}$$

$$\text{Multi-product breakeven point} = \frac{\text{Total fixed expenses}}{\text{Weighted-average UCM}}$$

1) The weighted-average selling price and weighted-average variable costs are calculated using the sales percentage of the individual products in the total sales mix.

2) The multi-product breakeven point provides the breakeven point of composite units, which is a mixture of all the different products.

a) From this, individual breakeven points can be calculated.

3) No unique breakeven point exists in a multi-product problem. The breakeven point varies with the sales mix. It is lower if a greater quantity of high-contribution-margin product is sold and vice versa.

b. A multi-product breakeven point in sales dollars can be calculated as follows:

$$\text{Weighted-average contribution margin ratio (CMR)} = \frac{\text{Weighted-average UCM}}{\text{Weighted-average unit selling price}}$$

$$\text{Multi-product breakeven point} = \frac{\text{Total fixed costs}}{\text{Weighted-average CMR}}$$

EXAMPLE 10-6 Multi-Product BEP

A manufacturer produces two products, Product V and Product W. Total fixed costs are $75,000. Variable cost and sales data for these products are as follows:

	Product V	Product W
Selling price per unit	$10	$18
Variable cost per unit	$7	$14
Budget sales (units)	6,000	18,000

The multi-product breakeven point in units can be calculated as follows:

$$\text{Weighted-average UCM} = \left[(\$10 - \$7) \times \frac{6{,}000}{6{,}000 + 18{,}000}\right] + \left[(\$18 - \$14) \times \frac{18{,}000}{6{,}000 + 18{,}000}\right]$$

$$= (\$3 \times 25\%) + (\$4 \times 75\%)$$

$$= \$3.75$$

$$\text{Multi-product breakeven point} = \frac{\text{Total fixed costs}}{\text{Weighted-average UCM}}$$

$$= \frac{\$75{,}000}{\$3.75}$$

$$= 20{,}000 \text{ composite units}$$

Therefore, the breakeven point in Product V

$$= 20{,}000 \text{ composite units} \times \left(\frac{6{,}000}{6{,}000 + 18{,}000}\right)$$

$$= 5{,}000 \text{ units}$$

Therefore, the breakeven point for Product W

$$= 20{,}000 \text{ composite units} \times \left(\frac{18{,}000}{6{,}000 + 18{,}000}\right)$$

$$= 15{,}000 \text{ units}$$

The multi-product breakeven point in sales dollars can be calculated as follows:

$$\text{Weighted-average CMR} = \frac{\text{Weighted-average UCM}}{\text{Weighted-average unit selling price}}$$

$$\text{Weighted-average CMR} = \frac{\$3.75}{\left(\$10 \times \frac{6{,}000}{6{,}000 + 18{,}000}\right) + \left(\$18 \times \frac{18{,}000}{6{,}000 + 18{,}000}\right)}$$

$$= \frac{\$3.75}{(\$10 \times 25\%) + (\$18 \times 75\%)}$$

$$= \frac{\$3.75}{\$16}$$

$$= 0.234375$$

$$\text{Multi-product breakeven point} = \frac{\text{Total fixed costs}}{\text{Weighted-average CMR}}$$

$$= \frac{\$75{,}000}{0.234375}$$

$$= \$320{,}000$$

2. Choice of Product

a. When resources are limited, a company may produce only a single product.

1) A breakeven analysis of the point where the same operating income or loss will result, regardless of the product selected, is calculated by setting the breakeven formulas of the individual products equal to each other.

2) EXAMPLE: Assume a lessor can rent property to either of two lessees. One lessee offers a rental fee of $100,000 per year plus 2% of revenues. The other lessee offers $20,000 per year plus 5% of revenues. The optimal solution depends on the level of revenues. A typical CMA question asks at what level the lessor will be indifferent. The solution is to equate the two formulas as follows:

$$\begin{aligned} \$100{,}000 + .02\,R &= \$20{,}000 + .05\,R \\ .03\,R &= \$80{,}000 \\ R &= \$80{,}000 \div .03 \\ R &= \$2{,}666{,}667 \end{aligned}$$

Where: R = revenues

Thus, if revenues are expected to be less than $2,666,667, the lessor would prefer the larger fixed rental of $100,000 and the smaller variable rental.

STUDY UNIT ELEVEN

MARGINAL ANALYSIS AND PRICING

This study unit is the **second of two** on **decision analysis**. The relative weight assigned to this major topic in Part 2 of the exam is **25%**. The two study units are

Study Unit 10: CVP Analysis
Study Unit 11: Marginal Analysis and Pricing

Marginal analysis allows economic decisions to be made based on projecting the results of varying the levels of resource consumption and output production. Thus, marginal revenue data must be compared with marginal cost data to determine the point of profit maximization. Additionally, the impact of income tax on each level of production must be considered in order to determine the profitability at each level and whether the company will meet its required rate of return.

If you are interested in reviewing more introductory or background material, go to www.gleim.com/CMAIntroVideos for a list of suggested third-party overviews of this topic. The following Gleim outline material is more than sufficient to help you pass the CMA exam. Any additional introductory or background material is for your personal enrichment.

11.1 DECISION MAKING -- APPLYING MARGINAL ANALYSIS

When applying marginal analysis to decision making, a CMA candidate must be able to easily identify avoidable and unavoidable costs. Unavoidable costs have no relevance to the decision-making process to drop or add a segment. This may seem simple, but a typical CMA exam question will not include whether the costs are relevant or irrelevant, and you must be able to readily identify them as such, calculate the cost, and recommend a course of action. Incorrectly identifying a cost for whatever reason could easily lead to an incorrect calculation and evaluation of the situation.

1. Accounting Costs vs. Economic Costs

a. The accounting concept of costs includes only explicit costs, i.e., those that represent actual outlays of cash, the allocation of outlays of cash, or commitments to pay cash. Examples include the incurrence of payables, the satisfaction of payables, and the recognition of depreciation.

b. The economic concept of costs includes both explicit and implicit costs.

1) Implicit in any business decision is opportunity cost, defined as “the contribution to income that is forgone by not using a limited resource in its best alternative use.”

c. EXAMPLE: A manufacturer’s accounting cost for a new product line consists only of the costs associated with the new machinery and personnel, but the economic cost includes the 4.75% return the company could make by simply investing the money in certificates of deposit.

2. **Explicit vs. Implicit Costs**

   a. Explicit costs are those requiring actual cash disbursements. For this reason, they are sometimes called out-of-pocket or outlay costs.

      1) Explicit costs are accounting costs, that is, they are recognized in a concern's formal accounting records.

      2) For example, an entrepreneur opening a gift shop has to make certain cash disbursements to get the business up and running.

Inventory	$50,000
Display cases	9,000
Rent	4,000
Utilities	1,000
Total explicit costs	**$64,000**

   b. Implicit costs are **opportunity costs**, i.e., the maximum benefit forgone by using a scarce resource for a given purpose and not for the next-best alternative.

      1) To measure the true economic success or failure of the venture, the entrepreneur in the example above must account for more than just the explicit costs that can easily be found in the accounting records.

         a) The entrepreneur's opportunity costs are the most important implicit costs. (S)he could have simply gone to work for another company rather than open the gift shop.

         b) The money put into startup costs could have been invested in financial instruments.

         c) A normal profit is a crucial implicit cost. In this example, the normal profit is the income that the entrepreneur could have earned applying his or her skill to another venture.

Salary forgone	$35,000
Investment income forgone	3,600
Total implicit costs	**$38,600**

   c. Economic costs are total costs.

      1) The true hurdle for an economic decision is whether the revenues from the venture will cover all costs, both explicit and implicit.

Economic costs = Total costs
= Explicit costs + Implicit costs
= $64,000 + $38,600
= $102,600

3. **Accounting vs. Economic Profit**

   a. Accounting profits are earned when the (book) income of an organization exceeds the (book) expenses.

      1) After the first year of operation, the gift shop owner made a tidy accounting profit.

Sales revenue	$100,000
Explicit costs	(64,000)
Accounting profit	**$ 36,000**

b. Economic profits are a significantly higher hurdle. They are not earned until the organization's income exceeds not only costs as recorded in the accounting records, but the firm's implicit costs as well. Economic profit is also called pure profit.

1) Once total costs are taken into account, a different picture emerges.

Accounting profit	$ 36,000
Implicit costs	(38,600)
Economic loss	**$ (2,600)**

4. **Relevant vs. Irrelevant Factors**

a. In decision making, an organization must focus on only relevant revenues and costs. To be relevant, the revenues and costs must

1) Be made in the future

a) Costs that have already been incurred or to which the organization is committed, called **sunk costs**, have no bearing on any future decisions.

b) EXAMPLE: A manufacturer is considering upgrading its production equipment due to the obsolescence of its current machinery. The amounts paid for the existing equipment are sunk costs; they make no difference in the decision to modernize.

2) Differ among the possible alternative courses of action

a) EXAMPLE: A manufacturer is considering purchasing production equipment from Meen Co. costing $400,000 with an estimated operating life of 5 years, or from Neem Equipment Ltd. costing $600,000 with an estimated operating life of 8 years.

b. Only avoidable costs are relevant. Unavoidable costs are irrelevant.

1) An **avoidable cost** may be saved by not adopting a particular option. Avoidable costs might include variable raw material costs and direct labor costs.

2) An **unavoidable cost** is one that cannot be avoided if a particular action is taken.

a) For example, if a company has a long-term lease on a building, closing out the business in that building will not eliminate the need to pay rent. Thus, the rent is an unavoidable cost.

c. **Incremental (marginal or differential) costs** are inherent in the concept of relevance.

1) Throughout the relevant range, the incremental cost of an additional unit of output is the same.

a) Once a certain level of output is reached, however, the current production capacity is insufficient and another increment of fixed costs must be incurred.

b) For example, a factory owner that operates one shift per day plans to add a second shift. This change requires an additional foreman (a fixed cost) and leaving the lights on around the clock (more fixed costs). The second shift, therefore, is outside the relevant range assumed for a one-shift operation.

d. A disadvantage of relevant cost determination is the use of unit revenues and costs.

1) The emphasis should be on total relevant revenues and costs because unit data may include irrelevant amounts or may have been computed for an output level different from the one for which the analysis is being made.

5. Marginal, Differential, or Incremental Analysis

a. The typical problem for which marginal (differential or incremental) analysis can be used involves choices among courses of action.

EXAMPLE 11-1 Relevant Costs

Sam is driving a 20-year-old automobile that gets poor fuel mileage and is subject to recurring repair bills.

1. The car is fully paid for, but a major engine overhaul may or may not be required within the next 12 months. The new car he is considering is a high-performance model and will not get noticeably higher fuel mileage than his current car.
2. Sam must decide between continuing to drive his current car or purchasing the new one, and he now must separate the costs that are relevant to the decision from those that are irrelevant.

Variable costs:	Relevant	Irrelevant
Repairs	✓	
Overhaul	✓	
Fixed costs, recurring:		
Loan	✓	
Insurance	✓	
License Plates		✓
Fixed costs, one-time:		
Trade-in value	✓	

3. Each item designated as relevant will both occur in the future and be different depending on which car Sam chooses.

b. **Quantitative analysis** emphasizes the ways in which revenues and costs vary with the option chosen. Thus, the focus is on incremental revenues and costs, not the totals of all revenues and costs for the given option.

1) A useful measurement of the quantitative effects of different options is to measure each option's contribution margin per unit of constraint.

a) **Contribution margin** is a product's price minus all associated variable costs.

b) The **constraint** is any measure of activity, such as direct labor hours, machine hours, beds occupied, computer time used, flight hours, miles driven, or contracts, that drives an entity's costs.

c) When a constraint is limited or unavailable, the manager should direct limited resources toward those products and services that produce the most contribution margin per unit of constraint.

d) An **optimum strategy** uses as much of the constraint as necessary to fill demand for the product or service with the highest contribution margin per unit of constraint. The remaining units of constraint are used on the product or service with the next highest contribution margin per unit until there is no available constraint.

EXAMPLE 11-2 Contribution Margin -- Optimum Strategy

A manufacturer assembled the following data regarding its two product lines.

	Product A	Product B
Annual unit demand	10,000	20,000
Selling price	$100	$ 80
Variable manufacturing cost	(55)	(42)
Fixed manufacturing cost	(10)	(10)
Variable selling and administrative	(10)	(12)
Fixed selling and administrative	(7)	(4)
Unit operating profit	$ 18	$ 12
Machine hours per unit	2.5	2.0

The manufacturer has 55,000 machine hours available.

Filling all demand would require 25,000 (10,000 units × 2.5 machine hours per unit) machine hours for Product A and 40,000 (20,000 units × 2 machine hours per unit) machine hours for Product B. The total time required is therefore 65,000 machine hours, but since there are only 55,000 available, the manufacturer must determine the contribution margin per machine hour for the two products to determine what to produce.

The contribution per machine hour can be calculated as follows:

	Product A	Product B
Sales price	$100	$ 80
Variable manufacturing cost	(55)	(42)
Variable S & A	(10)	(12)
Contribution margin	$ 35	$ 26
Divided by: Machine hours per unit	÷ 2.5	÷ 2.0
Contribution margin per machine hour	$ 14	$ 13

The manufacturer will produce as much as it can with the higher contribution margin per hour, then use any time left over to produce the other. Therefore, 10,000 units of Product A will be produced and the remaining 30,000 [55,000 – (10,000 units × 2.5 machine hours per unit)] hours will be used to produce 15,000 units (30,000 remaining hours ÷ 2.0 machine hours per unit) of Product B. This is the optimum strategy.

6. **Qualitative Factors**

   a. Caution always must be used in applying marginal analysis. Many qualitative factors, including those listed below, should be considered.

      1) Special price concessions place the firm in violation of the price discrimination provisions of the Robinson-Patman Act of 1936.
      2) Government contract pricing regulations apply.
      3) Sales to a special customer affect sales in the firm's regular market.
      4) Regular customers learn of a special price and demand equal terms.
      5) Disinvestment, such as by dropping a product line, will hurt sales in the other product lines (e.g., the dropped product may have been an unintended loss leader).
      6) An outsourced product's quality is acceptable and the supplier is reliable.
      7) Employee morale may be affected. If employees are laid off or asked to work too few or too many hours, morale may be affected favorably or unfavorably.

11.2 DECISION MAKING -- SPECIAL ORDERS

1. Submitting Bids for the Lowest Selling Price

a. Bids should be made at prices that meet or exceed incremental cost depending on how competitive the bid needs to be.

1) A bid lower than incremental cost can result in lower profit for the company.

a) However, lower bids are more competitive and are therefore closer to incremental cost.

2) The company must weigh quantitative and qualitative factors when deciding on a final bid.

a) Whether available capacity exists affects whether fixed costs will be included in the lowest possible bid price.

b) Management must be assured that acceptance of a special order will not affect sales at normal prices. Regular customers may demand the special order price.

2. Special Orders When Available Capacity Exists

a. When a manufacturer has available production capacity, no opportunity cost is involved when accepting a special order. This occurs because fixed costs are already committed and capacity is still available.

1) When capacity is available, fixed costs are **irrelevant**.

2) The company should accept the order if the minimum price for the product is equal to the variable costs.

EXAMPLE 11-3 Special Orders -- Available Capacity

Normal unit pricing for a manufacture's product is as follows:

Direct materials and labor	$15.00
Variable overhead	3.00
Fixed overhead	5.00
Variable selling	1.50
Fixed selling and administrative	12.00
Total cost	$36.50

If the manufacturer receives a special order for which capacity exists, the lowest bid the company could offer is $19.50 ($15.00 + $3.00 + $1.50).

3. Special Orders in the Absence of Available Capacity

a. When a manufacturer lacks available production capacity, the differential (marginal or incremental) costs of accepting the order must be considered. The variable costs of the production run and the opportunity cost of redirecting resources must be considered.

1) Although fixed costs are committed, given no available capacity, the manufacturer will have to reduce production of existing product lines to fill the special order.

2) This means that the revenue, variable costs, and fixed costs related to reduced production of existing product lines are **relevant**.

EXAMPLE 11-4 Special Orders -- No Available Capacity

Using the information from Example 11-3, if the manufacturer receives a special order for which capacity does not exist, the lowest bid the company could offer is $36.50.

In addition to fixed costs, any revenue lost from reducing or stopping production on other product lines would be relevant when determining the lowest acceptable bid price.

11.3 DECISION MAKING -- MAKE OR BUY

1. Make-or-Buy Decisions (Insourcing vs. Outsourcing)

a. The firm should use available resources as efficiently as possible before outsourcing.

1) If the total relevant costs of production are **less** than the cost to buy the item, it should be made in-house.

2) If the total relevant costs of production are **more** than the costs to buy the item, it should be bought (outsourced).

b. As with a special order, the manager considers only the costs relevant to the investment decision. The key variable is total relevant costs, not all total costs. Relevant costs include all variable costs plus any avoidable fixed costs.

1) Sunk costs are irrelevant.

2) Costs that do not differ between two alternatives should be ignored because they are not relevant to the decision being made.

3) Opportunity costs must be considered when idle capacity is not available. They are of primary importance because they represent the forgone opportunities of the firm.

a) In some situations, a firm may decide to stop processing one product in order to free up capacity for another product, reducing relevant costs and affecting the decision to make or buy.

c. The firm also should consider the **qualitative factors** of the decision.

1) Will the product quality be as high if a component is outsourced rather than produced internally?

2) How reliable are the suppliers?

2. Make-or-Buy Decisions When Available Capacity Exists

a. When capacity is available, fixed costs are **irrelevant** in deciding whether to make or buy the product.

EXAMPLE 11-5 Make-or-Buy -- Available Capacity

Lawton must determine whether to make or buy an order of 1,000 frames. Lawton can purchase the frames for $13 or make them in-house. Lawton currently has adequate available capacity. Cost information for the frames is as follows:

Total variable costs	$10
Allocable fixed costs	5
Total unit costs	$15

Since there is available capacity, the allocable fixed costs are not relevant. The total relevant costs of $10 are less than the $13 cost to purchase, therefore, Lawton should make the frames.

3. Make-or-Buy Decisions in the Absence of Available Capacity

a. When capacity is not available, the differential (marginal or incremental) costs of accepting the order must be considered.

1) This means that the revenue, variable costs, and fixed costs related to reduced production of existing product lines are **relevant** in deciding whether to make or buy the product.

2) If capacity is limited, the products made least efficiently should be outsourced so that resources can be concentrated on the products made most efficiently.

EXAMPLE 11-6 Make-or-Buy Decision -- No Capacity

Lawton has received another special order for 1,000 frames, but this month no capacity is available.

Since there is no available capacity, the allocable fixed costs are relevant. The total relevant costs of $15 are more than the $13 cost to purchase, therefore, Lawton should purchase the frames.

11.4 DECISION MAKING -- OTHER SITUATIONS

1. Sell-or-Process-Further Decisions

a. In determining whether to sell a product at the **split-off point** or process the item further at additional cost, the joint cost of the product is irrelevant because it is a sunk cost. The decision should be based on incremental costs and revenues.

1) **Joint (common) costs** are those costs incurred up to the point where the products become separately identifiable, called the split-off point.

a) Joint costs include direct materials, direct labor, and manufacturing overhead. Because they are not separately identifiable, they must be allocated to the individual joint products.

b. At the split-off point, the joint products acquire separate identities, and costs incurred after the split-off point are separable costs.

1) Separable costs can be identified with a particular joint product and are allocated to a specific unit of output.

2) Separable costs are relevant when determining whether to sell or process further.

c. Since joint costs cannot be traced to individual products, they must be allocated. The methods available for this allocation include

1) The **physical-measure-based approach** employs a physical measure, such as volume, weight, or a linear measure.

2) **Market-based approaches** assign a proportionate amount of the total cost to each product on a monetary basis.

a) Sales-value at split-off method
b) Estimated net realizable value (NRV) method
c) Constant-gross-margin percentage NRV method

d. The **physical-unit method** allocates joint production costs to each product based on their relative proportions of the measure selected.

1) EXAMPLE: A refinery processes 1,000 barrels of crude oil and incurs $100,000 of processing costs. The process results in the following outputs. Under the physical unit method, the joint costs up to split-off are allocated as follows:

Asphalt	$100,000 × (300 barrels ÷ 1,000 barrels)	=	$ 30,000
Fuel oil	$100,000 × (300 barrels ÷ 1,000 barrels)	=	30,000
Diesel fuel	$100,000 × (200 barrels ÷ 1,000 barrels)	=	20,000
Kerosene	$100,000 × (100 barrels ÷ 1,000 barrels)	=	10,000
Gasoline	$100,000 × (100 barrels ÷ 1,000 barrels)	=	10,000
Joint costs allocated			$100,000

2) The physical-unit method's simplicity makes it appealing, but it does not match costs with the individual products' revenue-generating potential.

3) However, its limitations are that it treats low-value products that are large in size as if they were valuable. As a result, a large, low-value product might always show a loss, whereas a small, high-value product will always show a profit.

e. The **sales-value at split-off method** is based on the relative sales values of the separate products at split-off.

1) EXAMPLE: The refinery estimates that the five outputs can sell for the following prices at split-off:

Asphalt	300 barrels at $ 60/barrel	=	$ 18,000
Fuel oil	300 barrels at $180/barrel	=	54,000
Diesel fuel	200 barrels at $160/barrel	=	32,000
Kerosene	100 barrels at $ 80/barrel	=	8,000
Gasoline	100 barrels at $180/barrel	=	18,000
Total sales value at split-off			$130,000

The total expected sales value for the entire production run at split-off is thus $130,000. Multiply the total joint costs to be allocated by the proportion of the total expected sales of each product:

Asphalt	$100,000 × ($18,000 ÷ $130,000)	=	$ 13,846
Fuel oil	$100,000 × ($54,000 ÷ $130,000)	=	41,539
Diesel fuel	$100,000 × ($32,000 ÷ $130,000)	=	24,615
Kerosene	$100,000 × ($ 8,000 ÷ $130,000)	=	6,154
Gasoline	$100,000 × ($18,000 ÷ $130,000)	=	13,846
Joint costs allocated			$100,000

f. The **estimated net realizable value (NRV)** method also allocates joint costs based on the relative market values of the products.

1) The significant difference is that, under the estimated NRV method, all separable costs necessary to make the product salable are subtracted before the allocation is made.

2) EXAMPLE: The refinery estimates final sales prices as follows:

Asphalt	300 barrels at $ 70/barrel	=	$21,000
Fuel oil	300 barrels at $200/barrel	=	60,000
Diesel fuel	200 barrels at $180/barrel	=	36,000
Kerosene	100 barrels at $ 90/barrel	=	9,000
Gasoline	100 barrels at $190/barrel	=	19,000

From these amounts, separable costs are subtracted (these costs are given):

Asphalt	$21,000 – $1,000	=	$ 20,000
Fuel oil	$60,000 – $1,000	=	59,000
Diesel fuel	$36,000 – $1,000	=	35,000
Kerosene	$ 9,000 – $2,000	=	7,000
Gasoline	$19,000 – $2,000	=	17,000
Total net realizable value			$138,000

Multiply the total joint costs to be allocated by the proportion of the final expected sales of each product:

Asphalt	$100,000 × ($20,000 ÷ $138,000)	=	$ 14,493
Fuel oil	$100,000 × ($59,000 ÷ $138,000)	=	42,754
Diesel fuel	$100,000 × ($35,000 ÷ $138,000)	=	25,362
Kerosene	$100,000 × ($ 7,000 ÷ $138,000)	=	5,072
Gasoline	$100,000 × ($17,000 ÷ $138,000)	=	12,319
Joint costs allocated			$100,000

g. The **constant-gross-margin percentage NRV** method is based on allocating joint costs so that the gross-margin percentage is the same for every product.

1) The three steps under this method are

a) Determine the overall gross-margin percentage.

b) Subtract the appropriate gross margin from the final sales value of each product to calculate total costs for that product.

c) Subtract the separable costs to arrive at the joint cost amount.

2) EXAMPLE: The refinery uses the same calculation of expected final sales price as under the estimated NRV method:

Asphalt	300 barrels at $ 70/barrel	=	$ 21,000
Fuel oil	300 barrels at $200/barrel	=	60,000
Diesel fuel	200 barrels at $180/barrel	=	36,000
Kerosene	100 barrels at $ 90/barrel	=	9,000
Gasoline	100 barrels at $190/barrel	=	19,000
Total of final sales prices			$145,000

The final sales value for the entire production run is thus $145,000. From this total, the joint costs and total separable costs are deducted to arrive at a total gross margin for all products:

$$\$145,000 - \$100,000 - \$7,000 = \$38,000$$

The gross margin percentage can then be derived:

$38,000 ÷ $145,000 = 26.21% (rounded)

Deduct gross margin from each product to arrive at actual cost of goods sold:

Asphalt	$21,000 – ($21,000 × 26.21%)	=	$15,497
Fuel oil	$60,000 – ($60,000 × 26.21%)	=	44,276
Diesel fuel	$36,000 – ($36,000 × 26.21%)	=	26,565
Kerosene	$ 9,000 – ($ 9,000 × 26.21%)	=	6,641
Gasoline	$19,000 – ($19,000 × 26.21%)	=	14,021

Deduct the separable costs from each product to arrive at the allocated joint costs:

Asphalt	$15,497 – $1,000	=	$ 14,497
Fuel oil	$44,276 – $1,000	=	43,276
Diesel fuel	$26,565 – $1,000	=	25,565
Kerosene	$ 6,641 – $2,000	=	4,641
Gasoline	$14,021 – $2,000	=	12,021
Joint costs allocated			$100,000

EXAMPLE 11-7 Sell at Split-Off or Process Further

Chief uses a joint process that yields two products, X and Y. Each product can be sold at its split-off point or processed further. All the additional processing costs are variable and can be traced to each product. Joint production costs are $25,000. Other sales and cost data are as follows:

	Product X	Product Y
Sales value at split-off point	$55,000	$30,000
Final sales value if processed further	75,000	45,000
Additional costs beyond split-off	12,000	17,000

Chief must evaluate whether the profit would be higher to sell at the split-off point or to process further:

	Product X	Product Y
Sales value	$ 75,000	$ 45,000
Allocated joint costs	(16,176)*	(8,824)**
Further processing costs	(12,000)	(17,000)
Profit	$ 46,824	$ 19,176

	Split Off X	Split Off Y
Sales value	$55,000	$30,000
Allocated joint costs	(16,176)*	(8,824)**
Profit	$38,824	$21,176

* $\left[\left(\frac{\$55,000}{\$55,000 + \$30,000}\right) \times \$25,000\right]$

** $\left[\left(\frac{\$30,000}{\$55,000 + \$30,000}\right) \times \$25,000\right]$

The profit is higher for Product X after further processing and higher for Y at the split-off point. Accordingly, Chief should process Product X further and sell Product Y at the split-off point.

2. Add-or-Drop-a-Segment Decisions

a. Disinvestment decisions are the opposite of capital budgeting decisions. They are decisions to terminate, rather than start, an operation, product or product line, business segment, branch, or major customer.

1) In general, if the marginal cost of a project exceeds the marginal revenue, the firm should disinvest.

b. Four steps should be taken in making a disinvestment decision:

1) Identify fixed costs that will be eliminated by the disinvestment decision (e.g., insurance on equipment used).

2) Determine the revenue needed to justify continuing operations. In the short run, this amount should at least equal the variable cost of production or continued service.

3) Establish the opportunity cost of funds that will be received upon disinvestment (e.g., salvage value).

4) Determine whether the carrying amount of the assets is equal to their economic value. If not, reevaluate the decision using current fair value rather than the carrying amount.

c. When a firm disinvests, excess capacity exists unless another project uses this capacity immediately. The cost of idle capacity should be treated as a relevant cost.

EXAMPLE 11-8 Disinvestment Decision

A company needs to decide whether to discontinue unprofitable segments. Abbreviated income statements of the two possible unprofitable segments are shown below. The other segments, not shown, are profitable with income over $200,000.

	Department A	Department B
Sales	$275,000	$115,000
Cost of goods sold	160,000	55,000
Other variable costs	130,000	50,000
Allocated corporate costs	75,000	30,000
Income (loss)	$(90,000)	$(20,000)

Only relevant costs should be considered in making this decision. Since the allocated corporate costs are still going to be incurred if the segment is discontinued, these costs should be ignored. Therefore, the income (loss) for each segment is calculated as follows:

	Department A	Department B
Sales	$ 275,000	$115,000
Cost of goods sold	(160,000)	(55,000)
Other variable costs	(130,000)	(50,000)
Income (loss)	$ (15,000)	$ 10,000

Since $15,000 will be saved if Department A is discontinued, it should be discontinued. However, discontinuing Department B will negate $10,000 of profit, so it should continue.

11.5 PRICE ELASTICITY OF DEMAND

1. Demand -- the Buyer's Side of the Market

a. Demand is a schedule of the amounts of a good or service that consumers are willing and able to purchase at various prices during a period of time.

1) Quantity demanded is the amount that will be purchased at a specific price during a period of time.

Demand Schedule

Price per Unit	Quantity Demanded
$10	0
9	1
8	2
7	3
6	4
5	5
4	6
3	7
2	8
1	9
0	10

2. Changes in Quantity Demanded

a. The law of demand states that if all other factors are held constant, the price of a product and the quantity demanded are inversely (negatively) related. The higher the price, the lower the quantity demanded.

1) A demand schedule can be graphically depicted as a relationship between the prices of a commodity (on the vertical axis) and the quantity demanded at the various prices (horizontal axis), holding other determinants of demand constant.

Law of Demand

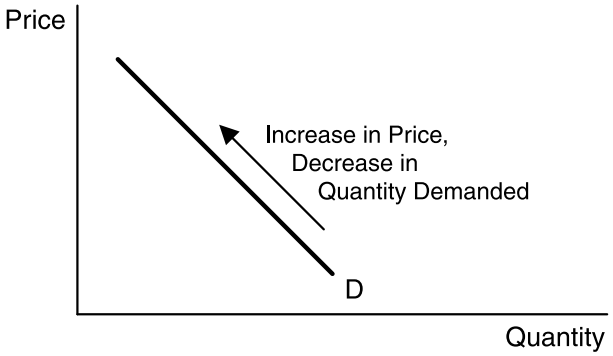


Figure 11-1

a) As the price of a good falls, consumers have more buying power (also called higher real income). They can buy more of the good with the same amount of money. This is termed the income effect.

b) As the price of one good falls, it becomes cheaper relative to other goods. Consumers will thus have a tendency to spend money on the cheaper good in preference to the more expensive one. This is termed the substitution effect.

3. **Changes in Demand**

   a. A change in price results in a change in quantity demanded, i.e., movement along a demand curve (depicted in Figure 11-1 on the previous page). But a change in one of the determinants of demand results in a change in demand, i.e., a shift of the curve itself.

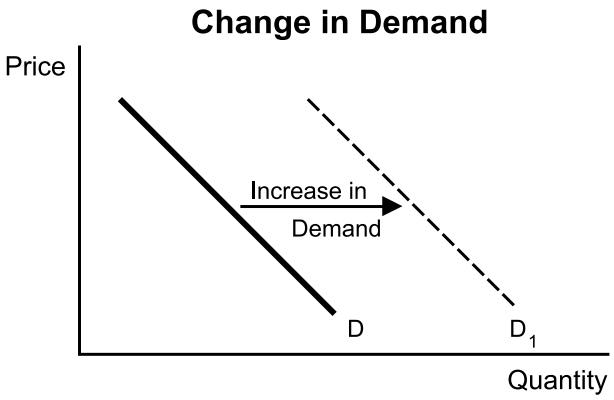


Figure 11-2

   b. Prestige goods (e.g., a high-priced watch) and normal goods may have different demand curves. For prestige goods, an increase in price might increase demand and a lower price might cause demand to decline. For example, if the price of a $10,000 watch were reduced to $100, some people might not buy it at the lower price because it would lack prestige. Also, some might think the $100 watch was counterfeit or defective.

4. **Price Elasticity of Demand**

   a. The price elasticity of demand (E_d) measures the sensitivity of the quantity demanded of a product to a change in its price.

$$E_d = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

      1) Elasticity describes the reaction to a change in price from one level to another. Thus, the most accurate way of calculating elasticity is the **midpoint formula**, which measures elasticity across a range.

$$E_d = \frac{\%\Delta Q}{\%\Delta P} = \frac{|Q_1 - Q_2| \div |Q_1 + Q_2|}{|P_1 - P_2| \div |P_1 + P_2|}$$

      2) Note that, because elasticity is always measured with a positive number, absolute value is used in the formula.

EXAMPLE 11-9 Price Elasticity of Demand

As the price for a particular product changes, the quantity of the product demanded changes according to the following schedule:

Total Quantity Demanded	Price per Unit
100	$45
150	40
200	35
225	30
230	25
232	20

The product's elasticity of demand (E_d) when price falls from $30 to $25 is 0.1210.

$$\begin{aligned} E_d &= [(230 - 225) \div (230 + 225)] \div [(\$30 - \$25) \div (\$30 + \$25)] \\ &= (5 \div 455) \div (\$5 \div \$55) \\ &= 0.0110 \div 0.0909 \\ &= 0.1210 \end{aligned}$$

b. When the demand elasticity coefficient is

1) **Greater than one**, demand is in a relatively elastic range. A small change in price results in a significant change in quantity demanded.

2) **Equal to one**, demand has unitary elasticity (usually a very limited range). A single-unit change in price brings about a single-unit change in quantity demanded.

3) **Less than one**, demand is in a relatively inelastic range. A large change in price results in an insignificant change in quantity demanded.

4) **Infinite**, demand is perfectly elastic (depicted as a horizontal line).

a) In pure competition, the number of firms is so great that one firm cannot influence the market price. The demand curve faced by a single seller in such a market is perfectly elastic (although the demand curve for the market as a whole has the normal downward slope).

b) EXAMPLE: Consumers will buy a farmer's total output of soybeans at the market price but will buy none at a slightly higher price. Moreover, the farmer cannot sell below the market price without incurring losses.

5) **Equal to zero**, demand is perfectly inelastic (depicted as a vertical line).

a) Some consumers' need for a certain product is so high that they will pay whatever price the market sets. The number of these consumers is limited and the amount they desire is relatively fixed.

b) EXAMPLE: Addiction to illegal drugs tends to result in demand that is unresponsive to price changes. In this example, existing buyers (addicts) will not be driven out of the market by a rise in price, and no new buyers will be induced to enter the market by a reduction in price.

c. Price elasticity of demand is useful for a firm wondering how a change in the price of a product will affect total revenue from that product.

Effect on Total Revenue

	Elastic Range	Unitary Elasticity	Inelastic Range
Price increase	Decrease	No change	Increase
Price decrease	Increase	No change	Decrease

11.6 PRICING

1. Pricing Objectives

a. Profit maximization is assumed in classical economic theory to be the overriding goal of all firms.

b. Target margin maximization is the process of setting prices to reach a specified percentage ratio of profits to sales.

c. Volume-oriented objectives set prices to meet target sales volumes or market shares.

d. Image-oriented objectives set prices to enhance the consumer's perception of the firm's merchandise mix.

e. Stabilization objectives set prices to maintain a stable relationship between the firm's prices and the industry leader's prices.

2. Price-Setting Factors

a. Supply of and demand for products and services are determined by customers' demand, the actions of competitors, and costs.

b. Internal Factors

1) Marketing objectives may include survival, current profit maximization, market-share leadership, or product-quality leadership.

2) Marketing-mix strategy.

3) All relevant costs (variable, fixed, and total costs) in the value chain from R&D to customer service affect the amount of a product that the company is willing to supply. Thus, the lower costs are in relation to a given price, the greater the amount supplied.

4) Organizational focus of pricing decisions.

5) Capacity.

a) For example, under peak-load pricing, prices vary directly with capacity usage. Thus, when idle capacity is available, that is, when demand falls, the price of a product or service tends to be lower given a peak-load pricing approach. When demand is high, the price charged will be higher. Peak-load pricing is often used by public utilities.

c. External Factors

1) The type of market (pure competition, monopolistic competition, oligopolistic competition, or monopoly) affects the price. For example, a monopolist is usually able to charge a higher price because it has no competitors. However, a company selling a relatively undifferentiated product in a highly competitive market may have no control over price.

a) Market structures are discussed in detail in item 4., beginning on the next page.

2) Customer perception of value and price is the value that the customer thinks (s)he is deriving from consuming a product or a service and the price the customer is willing to pay. In other words, the higher (lower) the price, the higher (lower) the perceived value.

3) The price-demand relationship.

a) The demand curve for normal goods is ordinarily downward sloping to the right (quantity demanded increases as the price decreases).

b) However, over some intermediate range of prices, the reaction to a price increase for prestige goods is an increase, not a decrease, in the quantity demanded.

i) Within this range, the demand curve is upward sloping. The reason is that consumers interpret the higher price to indicate a better or more desirable product. Above some price level, the relationship between price and quantity demanded will again become negatively sloped.

c) If demand is price elastic (inelastic), the ratio of the percentage change in quantity demanded to the percentage change in price is greater (less) than 1.0. For example, if customer demand is price elastic, a price increase will result in the reduction of the seller's total revenue.

4) Competitors' products, costs, prices, and amounts supplied.

d. The time horizon for price setting is important. Whether the decision is for the short-term (generally, less than 1 year) or the long-term determines which costs are relevant and whether prices are set to achieve tactical goals or earn a targeted return on investment. For example, short-term fixed costs may be variable in the long-term, and short-term prices may be raised (lowered) when customer demand is strong (weak).

1) From the long-term perspective, maintaining price stability may be preferable to responding to short-term fluctuations in demand. A policy of predictable prices is desirable when the company wishes to cultivate long-term customer relationships. This policy is only feasible, however, when the company can predict its long-term costs.

3. **Price Setting by Cartels**

a. A cartel arises when a group of firms joins together for price-fixing purposes. This practice is illegal except in international markets.

1) For example, the international diamond cartel De Beers has successfully maintained the market price of diamonds for many years by incorporating into the cartel almost all major diamond-producing sources.

b. A cartel is a collusive oligopoly. Its effects are similar to those of a monopoly. Each firm will restrict output, charge a higher (collusive or agreed-to) price, and earn the maximum profit.

1) Thus, each firm in effect becomes a monopolist, but only because it is colluding with other members of the cartel.

4. **General Pricing Approaches**

a. **Market-Based (Buyer-Based) Pricing**

1) Pricing under this approach starts with a target price (item 6., beginning on page 20, has a detailed discussion) and involves basing prices on the product's perceived value and competitors' actions rather than on the seller's cost. Nonprice variables in the marketing mix augment the perceived value. Market comparables, which are assets with similar characteristics, are used to estimate the price of a product.

a) For example, a cup of coffee may have a higher price at an expensive restaurant than at a fast-food outlet.

2) Market-based pricing is typical when there are many competitors and the product is undifferentiated, as in many commodities markets, e.g., agricultural products or natural gas.

b. **Competition-Based Pricing**

1) Going-rate pricing bases price largely on competitors' prices.
2) Sealed-bid pricing bases price on a company's perception of its competitors' prices.

c. **New Product Pricing**

1) Price skimming is the practice of setting an introductory price relatively high to attract buyers who are not concerned about price and to recover research and development costs.
2) Penetration pricing is the practice of setting an introductory price relatively low to gain deep market penetration quickly.

d. **Pricing by Intermediaries**

1) Using markups tied closely to the price paid for a product
2) Using markdowns, a reduction in the original price set on a product

e. **Price Adjustments**

1) Geographical Pricing
    a) FOB-origin pricing charges each customer its actual freight costs.
    b) A seller that uses uniform delivered pricing charges the same price, inclusive of shipping, to all customers regardless of their location.
        i) This policy is easy to administer, permits the company to advertise one price nationwide, and facilitates marketing to faraway customers.
    c) Zone pricing sets differential freight charges for customers on the basis of their location. Customers are not charged actual average freight costs.
    d) Basing-point pricing charges each customer the freight costs incurred from a specified city to the destination regardless of the actual point of origin of the shipment.
    e) A seller that uses freight-absorption pricing absorbs all or part of the actual freight charges. Customers are not charged actual delivery costs.
2) Discounts and Allowances
    a) Cash discounts encourage prompt payment, improve cash flows, and avoid bad debts.
    b) Quantity discounts encourage large volume purchases.
    c) Trade (functional) discounts are offered to other members of the marketing channel for performing certain services, such as selling.
    d) Seasonal discounts are offered for sales out of season. They help smooth production.
    e) Allowances (e.g., trade-in and promotional allowances) reduce list prices.
3) Discriminatory pricing adjusts for differences among customers, the forms of a product, or locations.
4) Psychological pricing is based on consumer psychology. For example, consumers who cannot judge quality may assume higher prices correlate with higher quality.
5) Promotional pricing temporarily reduces prices below list or even cost to stimulate sales.
6) Value pricing entails redesigning products to improve quality without raising prices or offering the same quality at lower prices.
7) International pricing adjusts prices to local conditions.

f. **Product-Mix Pricing**

1) Product-line pricing sets price steps among the products in the line based on costs, consumer perceptions, and competitors' prices.

2) Optional-product pricing requires the firm to choose which products to offer as accessories and which as standard features of a main product.

3) Captive-product pricing involves products that must be used with a main product, such as razor blades with a razor. Often the main product is relatively cheap, but the captive products have high markups.

4) By-product pricing usually sets prices at any amount in excess of storing and delivering by-products. Such prices allow the seller to reduce the costs and therefore the prices of the main products.

5) Product-bundle pricing entails selling combinations of products at a price lower than the combined prices of the individual items. This strategy promotes sales of items consumers might not otherwise buy if the price is low enough. An example is season tickets for sports events.

g. **Illegal Pricing**

1) Certain pricing tactics are illegal. For example, pricing products below cost to destroy competitors (predatory pricing) is illegal.

a) The U.S. Supreme Court has held that a price is predatory if it is below an appropriate measure of costs and the seller has a reasonable prospect of recovering its losses in the future through higher prices or greater market share.

2) Also illegal is price discrimination among customers. The Robinson-Patman Act of 1936 makes such pricing illegal if it has the effect of lessening competition, although price discrimination may be permissible if the competitive situation requires it and if costs of serving some customers are lower. The act applies to manufacturers, not service entities. Moreover, the act applies to buyers as well as sellers. A buyer may not knowingly accept a price that is so low as to be discriminatory.

3) Another improper form of pricing is collusive pricing. Companies may not conspire to restrict output and set artificially high prices. Such behavior violates antitrust laws.

4) Still another inappropriate pricing tactic is selling below cost in other countries (dumping), which may trigger retaliatory tariffs and other sanctions.

5. **Cost-Based Pricing**

a. This process begins with a cost determination followed by setting a price that will recover the value chain costs and provide the desired return on investment (i.e., the cost plus target rate of return).

1) When an industry is characterized by significant product differentiation, e.g., the automobile industry, cost-based and market-based pricing approaches are combined. A company that manufactures made-to-order industrial equipment will likely use cost-based pricing.

2) Basing prices on cost assumes that costs can be correctly determined. Thus, cost-behavior patterns, cost traceability, and cost drivers become important determinants of profitability.

b. In markup pricing, also called cost-plus pricing, the cost of the product is calculated, and then a percentage of those costs is added to determine price.

1) A cost-plus price equals the cost plus a markup, which is usually determined at the discretion of the company. Cost may be defined in many ways. Most companies use either absorption manufacturing cost or total cost when calculating the price. Variable costs may be used as the basis for cost, but then fixed costs must be covered by the markup.

Four Common Cost-Plus Pricing Formulas

Price = Total cost + (Total cost × Markup percentage)
Price = Absorption mfg. cost + (Absorption mfg. cost × Markup percentage)
Price = Variable mfg. cost + (Variable mfg. cost × Markup percentage)
Price = Total variable cost + (Total variable cost × Markup percentage)

c. The costs of unused capacity in production facilities, distribution channels, marketing organizations, etc., are ordinarily not assignable to products or services on a cause-and-effect basis, so their inclusion in overhead rates may distort pricing decisions.

1) Including the fixed costs of unused capacity in a cost-based price results in higher prices and in what is known as the downward (black hole) demand spiral.

2) As higher prices depress demand, unused capacity costs and the fixed costs included in prices will increase. As a result of still higher prices, demand will continue to spiral downward.

a) One way to avoid this problem is not to assign unused capacity costs to products or services. The result should be better operating decisions and better evaluation of managerial performance.

6. **Target Pricing**

a. A target price is the expected market price for a product or service, given the company's knowledge of its consumers' perceptions of value and competitors' responses.

1) The company's contacts with its customers and its market research studies provide information about consumers' perceptions of value.

2) The company must also gain information about competitors' potential responses by learning about their technological expertise, products, costs, and financial positions. This information may be obtained from competitors' customers, suppliers, employees, and financial reports. Reverse engineering of their products is also possible.

b. Target operating income per unit is the sales amount needed to cover the variable costs, fixed costs, and the net income the company wants to achieve during the period divided by the number of units forecast to be sold. Subtracting the net income from target operating income determines the target cost per unit. Relevant costs are all future value-chain costs whether variable or fixed.

1) Because it may be lower than the full cost of the product, the target cost may not be achievable unless the company adopts comprehensive cost-reduction measures.

c. Target pricing takes a product's entire life cycle into consideration. **Product life cycle** is the cycle through which every product goes from introduction to withdrawal or eventual demise.

d. **Value engineering** is a means of reaching targeted cost levels. It is a systematic approach to assessing all aspects of the value chain cost buildup for a product: R&D, design of products, design of processes, production, marketing, distribution, and customer service. The purpose is to minimize costs without sacrificing customer satisfaction.

1) Value engineering requires identifying value-added and nonvalue-added costs. **Value-added costs** are costs of activities that cannot be eliminated without reducing the quality, responsiveness, or quantity of the output required by a customer or the organization.

2) Value engineering also requires distinguishing between cost incurrence and locked-in costs. Cost incurrence is the actual use of resources, whereas **locked-in (designed-in) costs** will result in use of resources in the future as a result of past decisions. Traditional cost accounting focuses on budget comparisons, but value engineering emphasizes controlling costs at the design stage before they are locked in.

7. **Product Life Cycle and Pricing Decisions**

a. The strategy in the **precommercialization** (product development) stage is to innovate by conducting R&D, marketing research, and production tests. During product development, the entity has no sales, but it has high investment costs.

b. The **introduction stage** is characterized by slow sales growth and lack of profits because of the high expenses of promotion and selective distribution to generate awareness of the product and encourage customers to try it. Thus, the per-customer cost is high.

1) Competitors are few, basic versions of the product are produced, and higher-income customers (innovators) are usually targeted. Cost-plus prices are charged. They may initially be high to permit cost recovery when unit sales are low.

2) The strategy is to infiltrate the market, plan for financing to cope with losses, build supplier relations, increase production and marketing efforts, and plan for competition.

c. In the **growth stage**, sales and profits increase rapidly, cost per customer decreases, customers are early adopters, new competitors enter an expanding market, new product models and features are introduced, and promotion spending declines or remains stable.

1) The entity enters new market segments and distribution channels and attempts to build brand loyalty and achieve the maximum share of the market. Thus, prices are set to penetrate the market, distribution channels are extended, and the mass market is targeted through advertising.

a) Competition increases and prices fall.

d. In the **maturity stage**, sales peak but growth declines, competitors are most numerous but may begin to decline in number, and per-customer cost is low.

1) Profits are high for large market-share entities. For others, profits may fall because of competitive price-cutting and increased R&D spending to develop improved versions of the product.

2) The strategy is to defend market share and maximize profits through diversification of brands and models to enter new market segments; still more intensive distribution, cost cutting, advertising and promotions to encourage brand switching; and emphasizing customer service.

e. During the **decline stage**, sales and profits drop as prices are cut, and some entities leave the market. Customers include late adopters (laggards), and per-customer cost is low.

1) Weak products and unprofitable distribution media are eliminated, and advertising budgets are pared to the level needed to retain the most loyal customers. The strategy is to withdraw by reducing production, promotion, and inventory.

f. **Graphical Depiction**

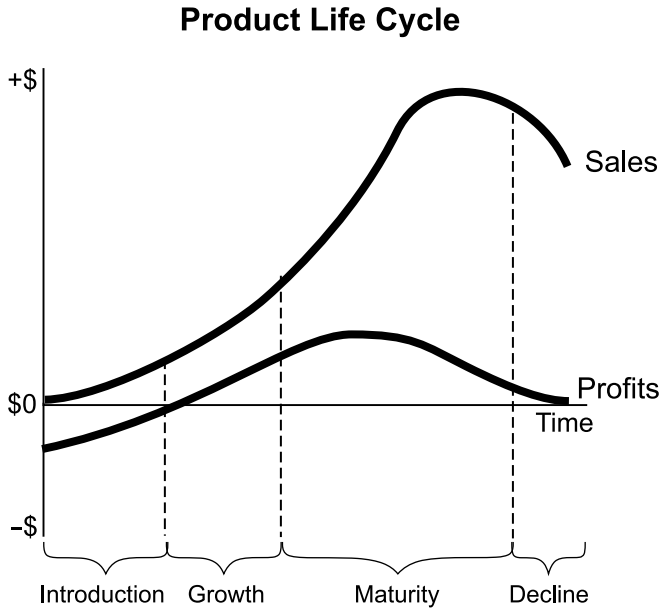


Figure 11-3

8. **Life-Cycle Costing**

a. The product life cycle begins with R&D, proceeds through the introduction and growth stages, continues into the product's mature stage, and finally ends with the harvest or decline stage and the final provision of customer support. Life-cycle costing is sometimes used as a basis for cost planning and product pricing.

1) Life-cycle costing estimates a product's revenues and expenses over its expected life cycle. The result is to highlight upstream (e.g., raw materials, research and development) and downstream (e.g., distribution, marketing) costs in the cost planning process that often receive insufficient attention. Emphasis is on the need to price products to cover all costs, not just production costs.

b. A concept related to life-cycle cost that is relevant to pricing is whole-life cost, which equals life-cycle costs plus after-purchase costs (operating, support, repair, and disposal) incurred by customers. Reduction of whole-life costs is a strong competitive weapon. Customers may pay a premium for a product with low after-purchase costs.