



# **Financial For Engineer**

**By Dr. Rafiq Mansoor**  
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# General Information

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# Reading List

## Core Textbook

- Stephen A. Ross, Randolph W. Westerfield, Jeffrey F. Jaffe, **Corporate Finance (Ninth Edition)**, McGraw-Hill Company Inc.



# Reading List

## Supplementary Reading

- Richard A. Brealey, Stewart C. Myers, Franklin Allen,  
**Principles of Corporate Finance (Tenth Edition),**  
McGraw-Hill Company Inc.



# Method of Assessment

- Participation and mid term : 50%
- Final project and final term : 50%



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# CHAPTER 1

## Lecture # 01

# Introduction to Corporate Finance



# Introduction to Finance

## ■ What is Finance

- Entrepreneurs and firms who need funds raise capital from those who have extra funds.
- The raised funds are used to finance value-enhancing projects.
- The value generated is shared among the economic participants.



# The Role of Finance

## ■ Finance facilitates economic growth

- Value-enhancing projects might have been otherwise forgone if there is no financial markets.
- Better projects are more likely to obtain funds due to the value maximization behavior of those who provide funds.

## ■ Financial crisis hurts the economy

- Over speculation boosts bubbles in the financial markets.
- The burst of the bubble destroys the capital raising function of financial markets.





# Three major areas in Finance

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■ Corporate Finance

■ Asset Pricing/Investment

■ Financial Markets and Financial Intermediates



# What is Corporate Finance

■ Corporate Finance addresses the following three questions:

- What long-term investment projects should the firm engage in? (**investment decision**)
- How can the firm raise the money for the required investment projects? (**financing decision**)
- How much short-term cash flow does a company need to pay its bills? (**net working capital**)



# Balance Sheet Model of the Firm

## Total Value of Assets:

**Current  
Assets**

**Fixed Assets**  
**1 Tangible**  
**2 Intangible**

## Total Firm Value to Investors:

**Current  
Liabilities**

**Long-Term  
Debt**

**Shareholders'  
Equity**



# The Capital Budgeting (Investment) Decision

**Current Assets**

**Current Liabilities**

**Long-Term Debt**

**Fixed Assets**

**1 Tangible**

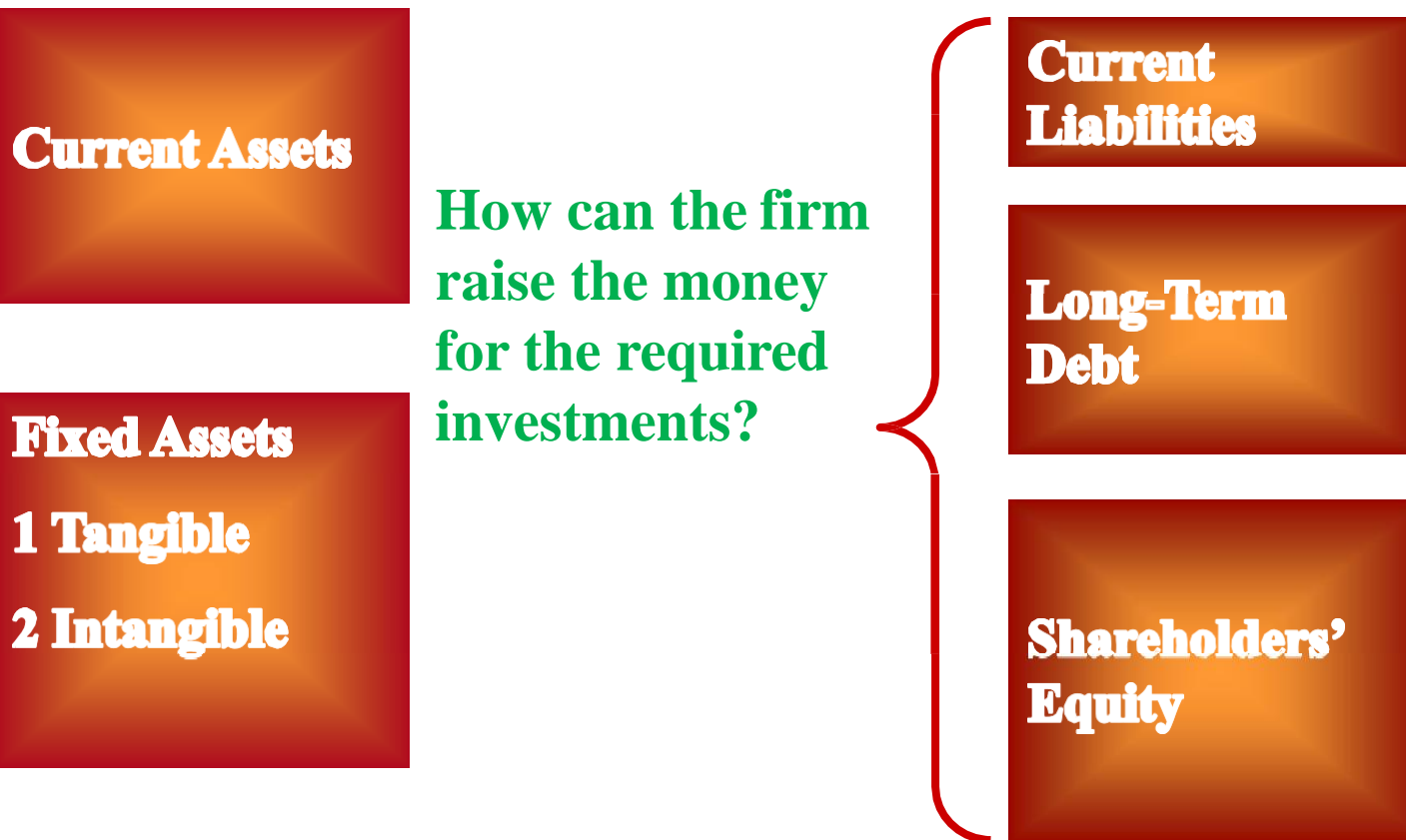
**2 Intangible**

**What long-term investments should the firm engage in?**

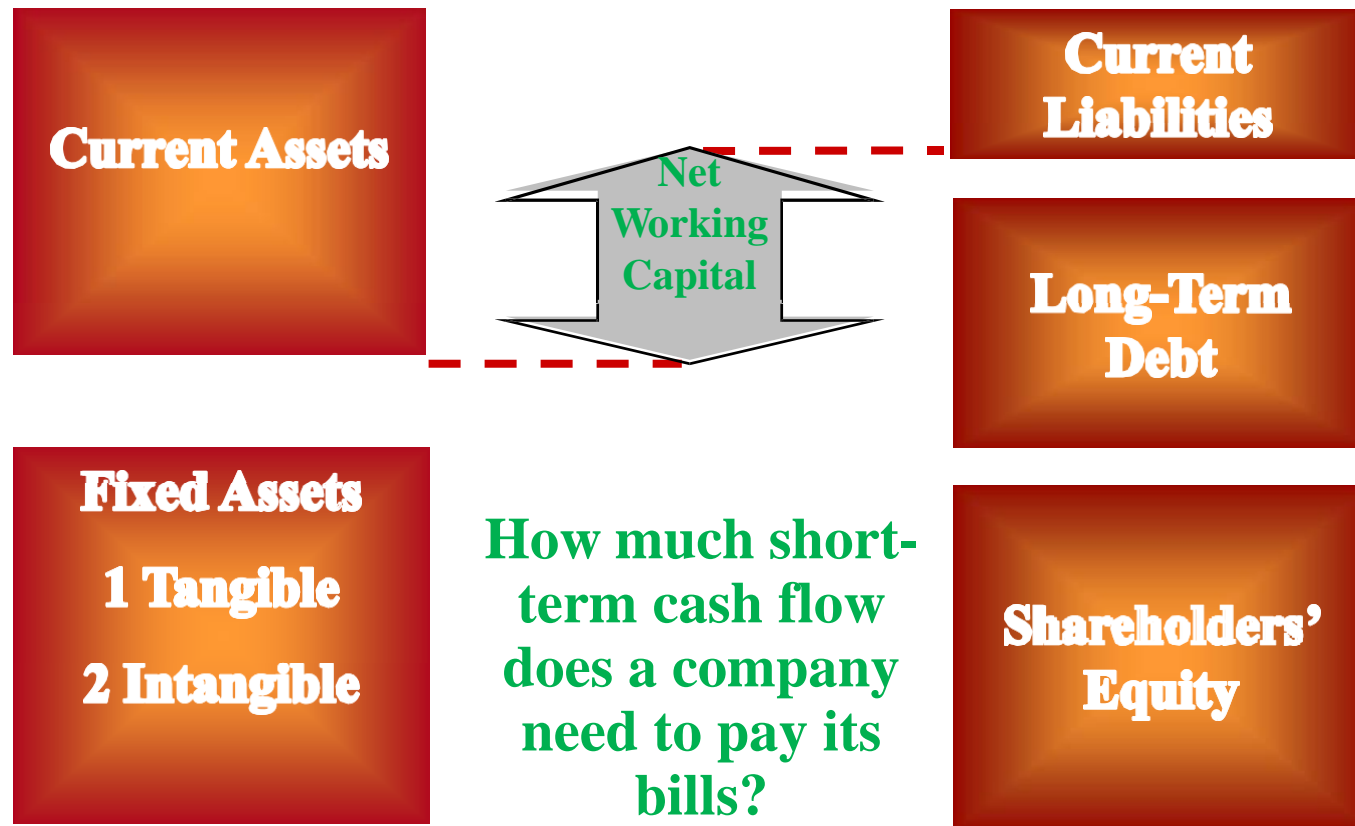
**Shareholders' Equity**



# The Capital Structure (Financing) Decision



# The Net Working Capital Investment Decision



# The Corporate Firm

- Three basic legal forms of organizing firms
  - The Sole Proprietorship
  - The Partnership
  - The Corporation



# The Sole Proprietorship

- A sole proprietorship is a business owned by one person
- Some factors of considering proprietorship
  - The sole proprietorship is the cheapest to form.
  - A sole proprietorship pays no corporate income tax, but individual income tax.
  - The sole proprietorship has unlimited liability for business debts and obligations.
  - The life of the sole proprietorship is limited by the life of the sole proprietor.
  - The equity money that can be raised by the sole proprietor is limited to the proprietor's personal wealth.





# The Partnership

- Any two or more people can get together and form a partnership
- A *partner* agree to provide some fraction of the work and cash, and to share the profits and losses
  - The *general partner* is liable for all of the debts of the partnership
  - The *limited partner* is permitted the liability to be limited to the amount of cash he/she contributed to the partnership.
- The limited partnership usually require that
  - At least one partner be a general partner
  - The limited partners do not participate in managing the business



# The Partnership (Cont.)

## ■ Factors of considering partnership

- Partnerships are usually inexpensive and easy to form
- If one general partner is unable to meet his or her commitment, the shortfall must be made up by the other general partners
- It is difficult for a partnership to transfer ownership. Usually all general partners must agree.
- Income from a partnership is taxed as personal income to the partners
- Management control resides with the general partners



# The Disadvantages of Proprietorship and Partnership

**Unlimited liability**

**Limited life of the enterprise**

**Difficulty of transferring ownership**

**Difficulty in raising cash**

- It is difficult for large business organizations to exist as sole proprietorships or partnerships. The main advantage to a sole proprietorship or partnership is the cost of getting started.



# The Corporation

- In a corporation, the ownership is divided into shares with equal value and voting rights.
- The liability of the shareholders, the owners of the shares, is limited to the value of their shares.
- The corporation comprises three sets of distinct interests: the shareholders (the owner), the directors, and the corporation officers (the top management).
- The shareholders elect a board of directors, who in turn select top management.
- Top management should manage the operations of the corporations in the best interest of the shareholders.



## Advantages of the Separation of Ownership from Management

- Because ownership in a corporation is represented by shares of stock, ownership can be readily transferred to new owners.
- The corporation has unlimited life.
- The shareholders' liability is limited to the amount invested in the ownership shares.
- Limited liability, ease of ownership transfer, and perpetual succession are the major advantages which gives the corporation an enhanced ability to raise funds.



# One Great Disadvantage to Corporation

## ■ Double taxation on corporation

- The government taxes corporate income (based on the earnings within corporations).
- In addition when earnings are distributed to the shareholders receive as dividend, they need to pay personal income tax. When shareholders sell their shares they have to pay capital gain tax.

In Proprietorship and partnership pays only personal income tax.



# A Comparison

|   | Corporation                      | Partnership   |
|---|----------------------------------|---|
| <b>Liquidity</b>                        | Shares can be easily exchanged   | Subject to substantial restrictions   |
| <b>Voting Rights</b>                    | Usually each share gets one vote | General Partner is in charge; limited partners may have some voting rights              |
| <b>Taxation</b>                         | Double                           | Partners pay taxes on distributions   |
| <b>Reinvestment and dividend payout</b> | Broad latitude                   | All net cash flow is distributed to partners  |
| <b>Liability</b>                        | Limited liability                | General partners may have unlimited liability; limited partners enjoy limited liability |
| <b>Continuity</b>                       | Perpetual life                   | Limited life  |



# The Financial Manager

- The Financial Manager's primary goal is to increase the value of the firm by:
  - Selecting value creating projects
  - Making smart financing decisions



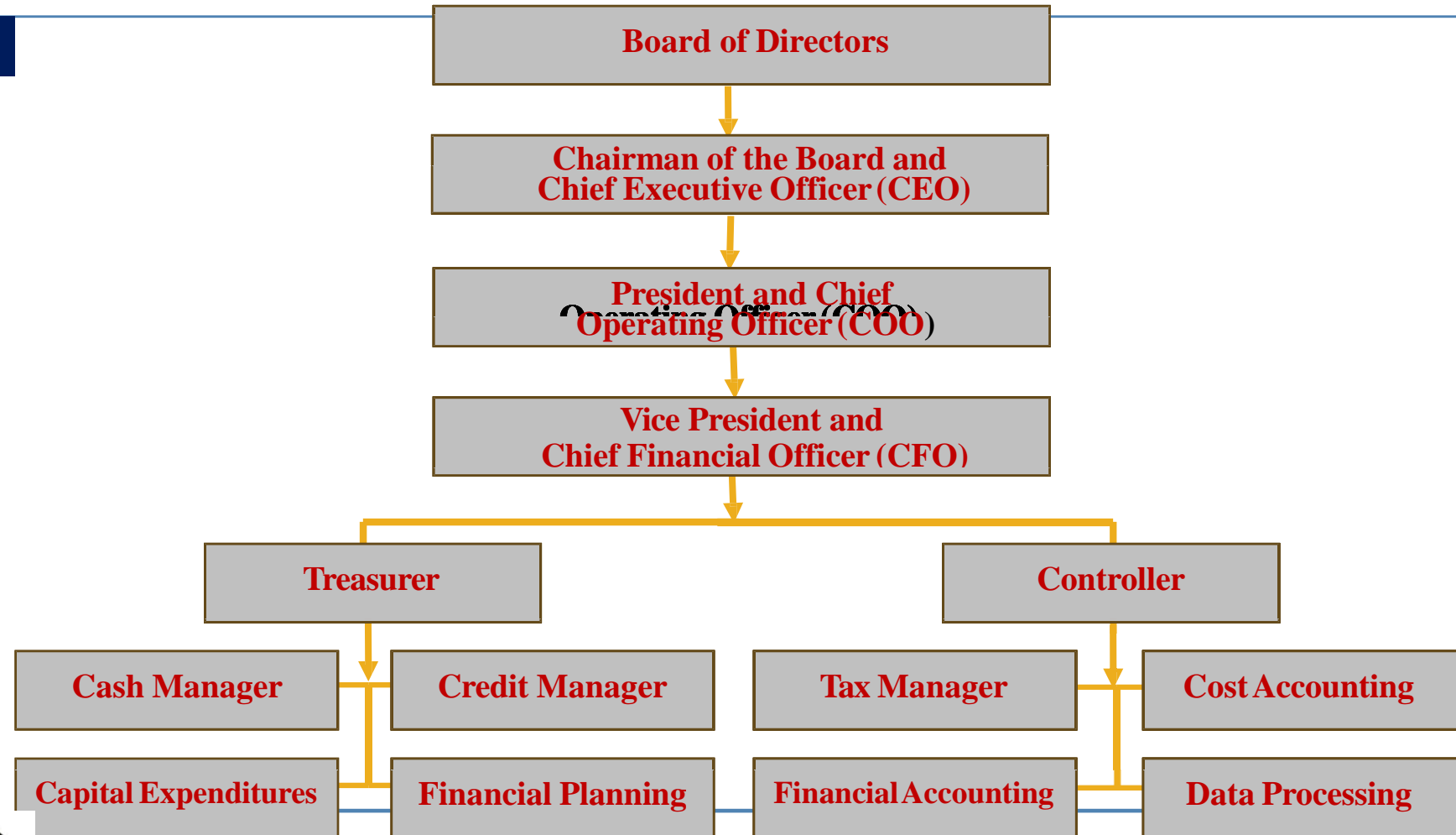


# The Financial Managers

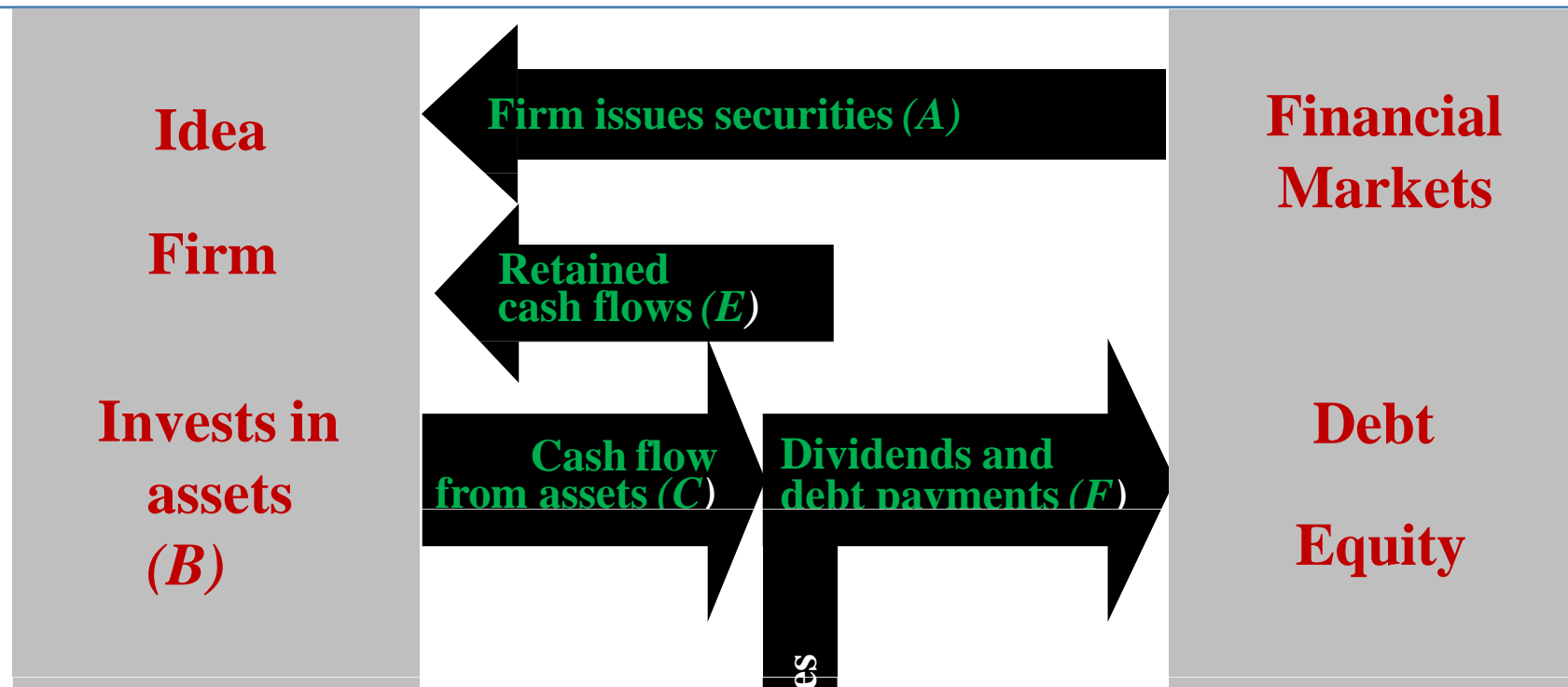
- In large firms the chief financial officer (CFO) is in charge of the financial activity.
- The treasurer and the controller report to the CFO.
- Treasurer
  - Handling cash flows, managing capital expenditure decisions, and making financial plans.
- Controller
  - Handle the accounting functions, which includes taxes, cost of financial accounting, and information system.



# Hypothetical Organization Chart



# Firms and Financial Markets



Ultimately, the firm must be a *cash generating activity*.

The cash flows from the firm must exceed the cash flows from the financial markets.



# The Goal of Financial Management

## ■ Possible goals

- Survive.
- Avoid financial distress and bankruptcy.
- Beat the competition.
- Maximize sales or market share.
- Minimize costs.
- Maximize profits.
- Maintain steady earnings growth.



# The Goal of Financial Management

To create value, the financial manager should:

1. Try to make smart **investment** decisions.
2. Try to make smart **financing** decisions.
3. Try to make smart use of **net working capital**.



# The Goal of Financial Management

- Since that financial managers make decisions for the shareholders in their best interests, the shareholders' point of view on a good financial management decision is important.
- Shareholders buy stocks because they seek to gain financially: Good decision increase the value of the stock, and poor decisions decrease the value of the stock.
- **The goal of financial management is to maximize the current value per share of the existing stock.**



# Share Value or Firm Value

- Is share value maximization consistent with firm value maximization?
- The value of a firm is the value of its assets, which is the sum of debt holders' value and shareholders' value.
- Given a fixed firm value, the managers can increase the shareholders' value by destroying debt holders value.
- Is this a good strategy?



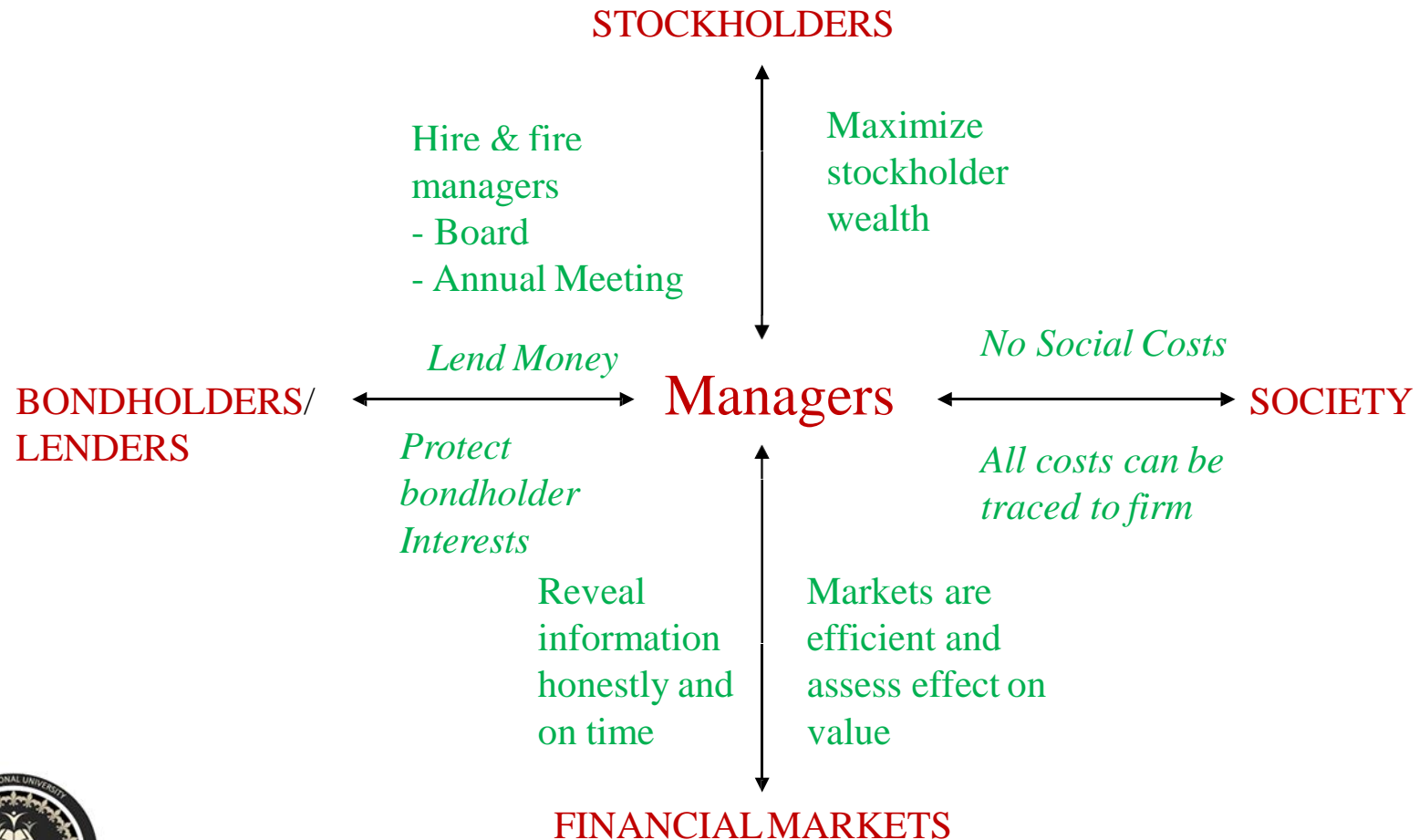
# Share Value or Firm Value (Cont.)

- It is in shareholders' interest to convince debt holders that they will not hurt debt holders.
  - For example, debt covenants could be written in the debt contract, which impose restrictions on the behavior of managers.
- In this course we assume that shareholders are able to convince debt holders, and the only way to maximize shareholder value is to maximize firm value.
- Shareholder value maximization is consistent with firm value maximization.

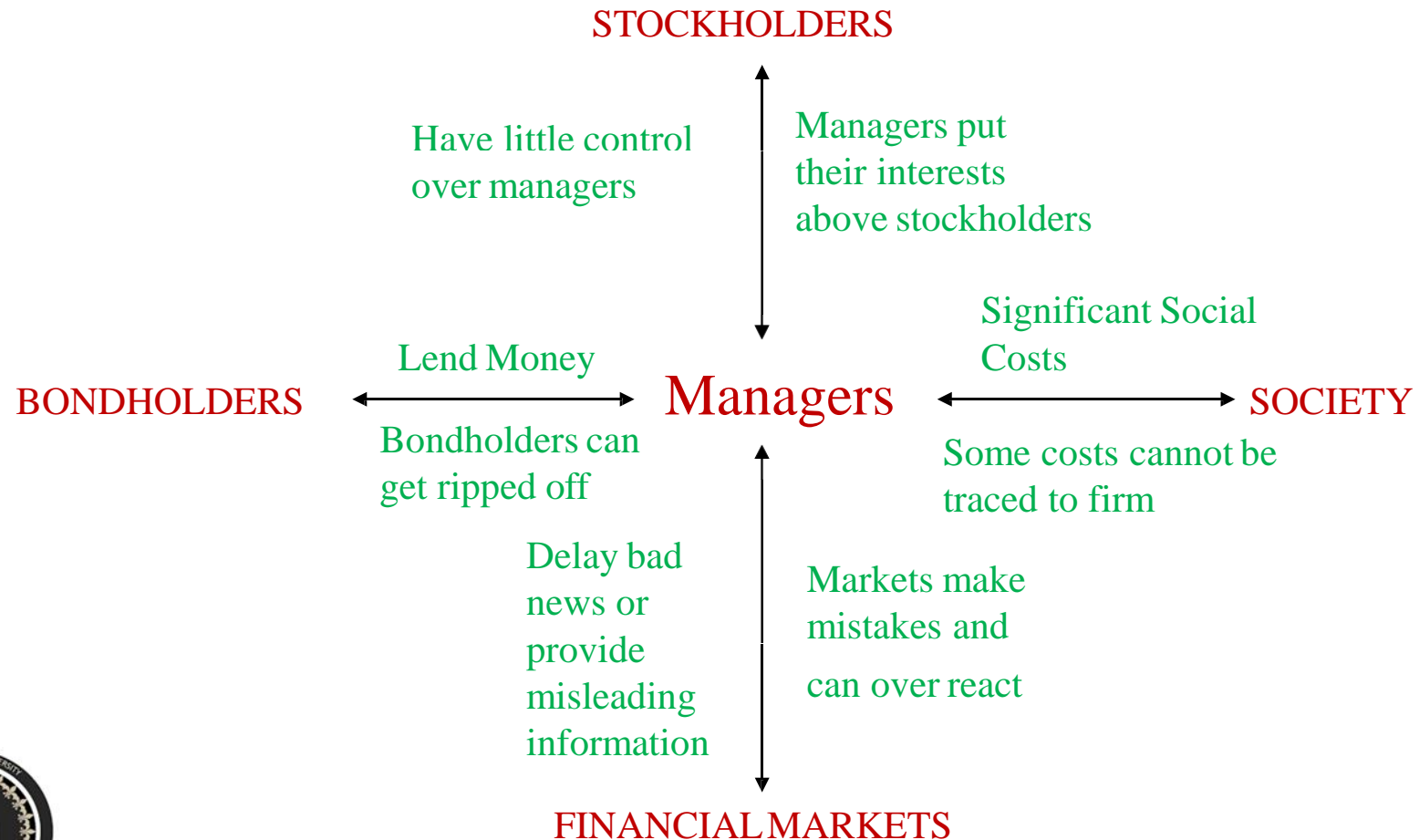




# The Classical Objective Function



# What can go wrong?



# Stockholder Interests vs. Management Interests

- In theory: The stockholders have significant control over management. The two mechanisms for disciplining management are the annual meeting and the board of directors. Specifically, we assume that
  - Stockholders who are dissatisfied with managers can not only express their disapproval at the annual meeting, but can use their voting power at the meeting to keep managers in check.
  - The board of directors plays its true role of representing stockholders and acting as a check on management.
- management as theory posits.



# The Annual Meeting as a disciplinary venue

- The power of stockholders to act at annual meetings is diluted by three factors
  - Most small stockholders do not go to meetings because the cost of going to the meeting exceeds the value of their holdings.
  - Incumbent management starts off with a clear advantage when it comes to the exercise of proxies. Proxies that are not voted becomes votes for incumbent management.
  - For large stockholders, the path of least resistance, when confronted by managers that they do not like, is to vote with their feet.
- Annual meetings are also tightly scripted and controlled events, making it difficult for outsiders and rebels to bring up issues that are not to the management's liking.



# Board of Directors as a disciplinary mechanism

- In 2010, the median board member at a Fortune 500 company was paid \$212,512, with 54% coming in stock and the remaining 46% in cash. If a board member is a non-executive chair, he or she receives about \$150,000 more in compensation.
- A board member works, on average, about 227.5 hours a year (and that is being generous), or 4.4 hours a week, according to the National Association of Corporate Directors. Of this, about 24 hours a year are for board meetings.
- Many directors serve on three or more boards, and some are full time chief executives of other companies.



# The Agency Problem

## ■ Agency Relationship

- The dark side of the separation of ownership from management is the *agency relationship* between the managers and shareholders.
- The agency relationship exists whenever someone (the *principal*) hires another (*agent*) to represent his or her interests.

## ■ Agency Problem

- The essential problem of the agency relationship lies in the conflict of interest between the principal and agent, which is called the *agency problem*.

## ■ Agency Cost

- The costs incurred by the conflicts of interest between the principal and agent are *agency costs*.



# Some Types of Typical Agency Problems

## ■ Consumption of perquisites

- Top managers are able to enjoy non-pecuniary benefits more than necessary which may hurt shareholders.
- This may happy even if top managers themselves are shareholders.
  - For example, if managers who hold 5% of the firm's shares purchase a 4 million Rolls-Royce for business purpose, their cost is only 200 thousand.
  - They enjoy the vehicle which is not necessary. But shareholders share most of the cost.



# Some Types of Typical Agency Problems

## ■ Overinvestment

- Managers prefer excessive growth of their firms
  - Large firms have more perquisites
  - One incentive of managers is to prevent bankruptcy to protect their jobs. They are safer in large firms.
- Managers tend to invest beyond the optimal level, which destroys share value.
- Example: Over-investment in China?





# Why Shareholders Cannot Control Managers

- Ownership structure of U.S. listed firms is well dispersed.

- Listed firms are held by millions of investors, which means an average investor hold only a tiny fraction of a firm's shares.
- Individuals are not able to replace the managers, while it is also difficult for shareholders to act collectively to monitor the management due to the *free-rider problem*.

- Ownership structure outside U.S. especially in East Asia is much more concentrated.

- Does it mean less severe agency problem in Asia?



# The Agency Problem in East Asia

- In East Asia, the ownership structure is heavily concentrated.
  - Generally a large fraction of a listed firm's shares are held by its parent company or a family.
  - It is easy for large shareholders to control management.
- The agency problem lies in the conflict of interest between large shareholders and minority shareholders.
- It is easy for large shareholders to expropriate the interest of minority shareholders.
  - Example: asset diversion (listed firms are cashier of their parent firms.)



# Corporate Governance Mechanism

- Managerial compensation
- Board of directors
- Takeover market
- Production market
- CEO market
- Ownership structure
- Use of corporate debt



# Raising Capital in the Financial Markets

- Firms raise debt and equity capital from both *public* and *private* sources.

- Public Sources of Capital

- Capital raised from public sources must be in the form of registered securities.
- *Securities* are publicly traded financial instruments. They are traded on public *secondary market*, after issued on *primary market*.
- Most securities must be registered with the **Securities and Exchange Commission (SEC)**.



# Raising Capital in the Financial Markets

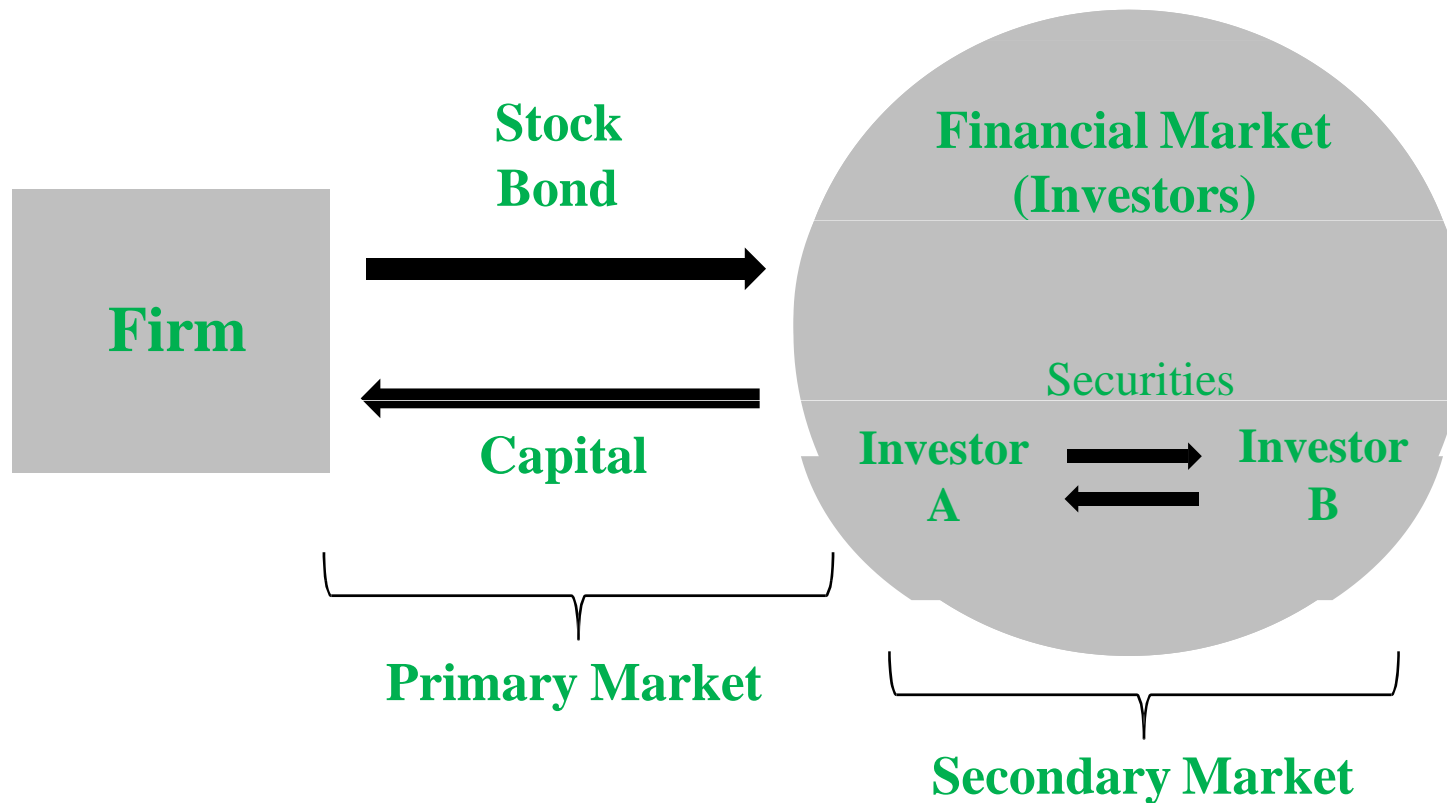
## ■ Private Sources of Capital

- Private capital comes either in the form of bank loans or as what are known as *private placements*.
- *Private placements* are financial claims exempted from the registration requirements that apply to securities.
  - To be qualified for exemption the issue must be restricted to a small group of sophisticated investors (fewer than 35) with minimum income or wealth requirements
- Privately placed financial instruments cannot be traded on public markets.
- **Rule 144A** allows institutions with assets exceeding \$100 million to trade these financial claims among themselves.



# Primary and Secondary Markets

## ■ Primary and Secondary Markets



# Secondary Markets

- A corporation is directly involved only in the primary market.
- A secondary market transaction involves one owner or creditor selling to another.
- The secondary markets provide the means for transferring ownership of corporate securities.
- The secondary market is critical to large corporation though they do not involve in it.
  - Investors are more willing to buy securities that can be resold easily.
  - It will be easier for a corporation to raise capital if their securities are traded actively (*liquid securities*).



# Dealer vs. Auction Markets

## ■ *The dealer markets (over-the-counter, OTC markets)*

- *Dealer (market maker):* principals that buy and sell securities on their own account.
- *Broker :* agents who facilitate the transactions between the buyers and sellers, and charge commissions.
- In the dealer market, in most of the cases, it is the dealers who provide the bid – ask spread quotes.
- The dealers add liquidity to the marketplace and seek to profit from the bid – ask spread.





# Examples of Dealer Markets

- U.S. treasury bills, treasury notes and treasury bonds markets

- Large financial institutions purchase the debt instruments in the primary markets and then become dealers in the secondary markets.

- NASDAQ (National Association of Securities Dealers Automated Quotation System)

- It is a large OTC market for stocks.

- Foreign exchange market



# Auction Markets

## ■ Auction markets differ from dealer markets in two ways:

- An auction market has a physical location (like stock exchanges on Wall Street).
- A dealer market, most of the buying and selling is done by the dealer. While the primary purpose of an action market is to match those who wish to sell with those who wish to buy.

## ■ Examples of auction markets:

- New York Stock Exchange (NYSE), which accounts for more than 85 percent of all the shares traded in the auction market.
- American Stock Exchange (AMEX).
- Shanghai and Shenzhen Stock Exchange.



# The Role of Financial Intermediaries

## ■ Commercial bank

- Commercial banks receives deposits from those who have extra money and lend to those who need money.
- Financing through bank loan is called *indirect financing*.

## ■ Investment bank

- When firms need to raise capital from the public, investment banks help to sell the securities. They help to prepare registration forms, price the security, search potential institutional investors and marketing the firms to the public.
- Raising capital from the public is called *direct financing*.



# Home Based Assignment

- What are the three basic questions Financial Managers must answer?
- What are the three major forms of business organization?
- What is the goal of financial management?
- What are agency problems, and why do they exist within a corporation?



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# CHAPTER 2

## Lecture #02

# Financial Statements and Cash Flow

By Dr. Rafiq Mansoor



# Balance Sheet

- *Balance sheet* is an accountant's snapshot of a firm's accounting value on a particular date.
- $\text{Assets} \equiv \text{Liabilities} + \text{Stockholder's Equity}$
- Three concerns when analyzing the balance sheet
  - Liquidity
  - Debt versus Equity
  - Value versus Cost



# Liquidity

- **Liquidity** : the ease and quickness with which assets can be converted to cash (without significant loss in value).
- The assets in the balance sheet are listed in order by the liquidity.
- Cash is the most liquid asset, while fixed assets are difficult to be converted to cash quickly.
- But on the other hand liquid assets frequently have lower rates of return than fixed assets.



# The Balance Sheet of the U.S. Composite Corporation

## U.S. COMPOSITE CORPORATION

### Balance Sheet 20X2 and 20X1

(in \$ millions)

| Assets                             | 20X2           | 20X1           |
|------------------------------------|----------------|----------------|
| <b>Current assets:</b>             |                |                |
| Cash and equivalents               | \$140          | \$107          |
| Accounts receivable                | 294            | 270            |
| Inventories                        | 269            | 280            |
| Other                              | 58             | 50             |
| <b>Total current assets</b>        | <b>\$761</b>   | <b>\$707</b>   |
| <b>Fixed assets:</b>               |                |                |
| Property, plant, and equipment     | \$1,423        | \$1,274        |
| Less accumulated depreciation      | -550           | -460           |
| Net property, plant, and equipment | 873            | 814            |
| Intangible assets and other        | 245            | 221            |
| <b>Total fixed assets</b>          | <b>\$1,118</b> | <b>\$1,035</b> |
| <b>Total assets</b>                | <b>\$1,879</b> | <b>\$1,742</b> |

The assets are listed in order by the length of time it normally would take a firm with ongoing operations to convert them into cash.

Clearly, cash is much more liquid than property, plant and equipment.





# Debt versus Equity

- Liabilities are obligations of the firm that require a payout of cash within a stipulated period.
- When the firm borrows, it gives the bondholders first claim on the firm's cash flow.
- Stockholders' equity is a claim against the firm's assets that is residual and not fixed.
- Stockholders' equity is the residual difference between assets and liabilities:

➔  $\text{Assets} - \text{Liabilities} \equiv \text{Stockholders' equity.}$



# Value versus Cost

- Under Generally Accepted Accounting Principles (**GAAP**), audited financial statements of firms in the United States carry the assets at costs.
- Accounting value (book value) of an asset generally reflects the costs of obtaining that asset, not the market value.
- Market value is the price at which willing buyers and sellers would trade the assets.



# The Income Statement

- The income statement measures performance over a specific period of time.
- The accounting definition of income is
  - Revenue – Expenses  $\equiv$  Income
- *Income is different from cash flow*



# Example: U.S.C.C. Income Statement

U.S. COMPOSITE CORPORATION Income Statement 20X2

(in \$ millions)

The operations section of the income statement reports the firm's revenues and expenses from principal operations

|   |             |
|---|-------------|
| Total operating revenues                      | \$2,262     |
| Cost of goods sold                            | - 1,655     |
| Selling, general, and administrative expenses | - 327       |
| Depreciation                                  | <u>- 90</u> |
| Operating income                              | \$190       |
| Other income                                  | <u>29</u>   |
| Earnings before interest and taxes            | \$219       |
| Interest expense                              | <u>- 49</u> |
| Pretax income                                 | \$170       |
| Taxes   | - 84        |
| Current: \$71                                 |             |
| Deferred: \$13                                |             |
| Net income                                    | <u>\$86</u> |
| Retained earnings:                            | <u>\$43</u> |
| Dividends:                                    | \$43        |



# Example: U.S.C.C. Income Statement

U.S. COMPOSITE CORPORATION Income Statement 20X2

(in \$ millions)

The non-operating section of the income statement includes all financing costs, such as interest expense.

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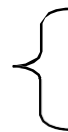
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Usually a separate section reports as a separate item the amount of taxes levied on income.



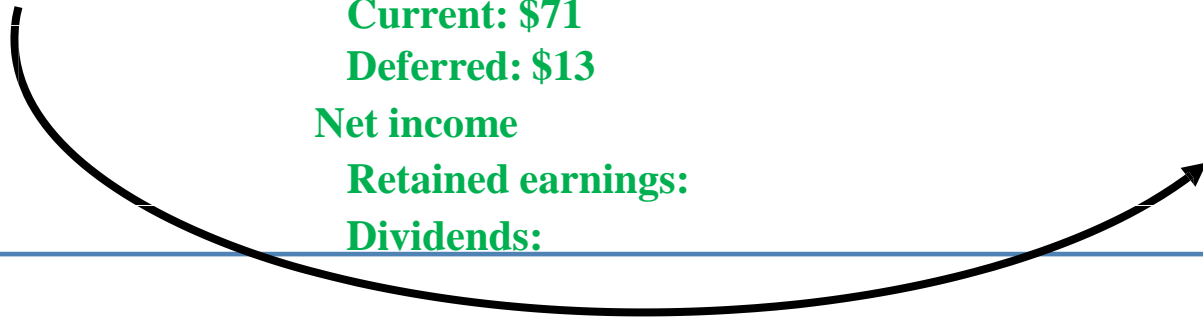
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(in \$ millions)

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Net income is the  
“bottom line”.



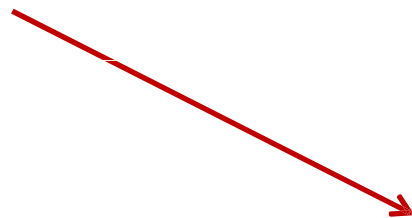
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Distribution of  
the income





# Noncash Items

- Net income is not cash flow!

- There are several *noncash items* that are expenses against revenues but do not affect cash flow.

- Depreciation:

- cash outflow occurs at the time when fixed assets are purchased, but the total cash outflow is expensed over the life time of the fixed assets.
- Depreciation, which is not real cash outflow, is deducted from the revenue.
- It should be added to net income to reach the real cash flow.



# Noncash Items

## ➤ Deferred Tax

- When the taxable income is less than the accounting income (on the income statement), the accounting tax (on the income statement) should be break down into two components,
  - ◆ Current tax: the portion of the accounting tax currently sent to the tax authority.
  - ◆ Deferred tax: the portion which will be paid later.
- The deferred tax, which is not a cash outflow in the current year, is deducted from the revenue.
- The deferred tax should be added to net income to reach cash flow.



# Financial Cash Flow

- The most important item that can be extracted from financial statements is the actual cash flow of the firm.
- The cash from received from the firm's assets must equal the cash flows to the firm's creditors and stockholders:

$$CF(A) \equiv CF(D) + CF(E)$$



# First Step: Cash Flow from Operation

- Operating cash flow is the cash flow generated by business activities, including sales of goods and services.
- Operating cash flow reflects tax payments, but not financing, capital spending, or changes in net working capital.
- Operating cash flow = Earnings before interest and taxes  
– Taxes (current portion) + Depreciation



# Total Cash Flow of the U.S.C.C.

## U.S. COMPOSITE CORPORATION

Financial Cash Flow  
20X2  
(in \$ millions)

### Cash Flow of the Firm

#### Operating cash flow

(Earnings before interest and taxes  
plus depreciation minus taxes)

\$238

### Operating Cash Flow:

EBIT \$219

#### Capital spending

(Acquisitions of fixed assets minus  
sales of fixed assets) Additions to net  
working capital

(173)

Depreciation \$90

Current Taxes (\$71)

#### Total

(23)

\$42

OCF \$238

### Cash Flow of Investors in the Firm

Debt  
(Interest plus retirement of debt  
minus long-term debt financing)

\$36

#### Equity

(Dividends plus repurchase of

6

equity minus new equity financing)

#### Total

\$42



## Second Step: Capital Spending

- Operating cash flow can be used on capital spending

- Two methods to calculate capital spending:

- Statement of Cash Flow:

- Acquisition of fixed assets – Sales of fixed assets

- Balance Sheet:

- Ending net fixed assets – Beginning net fixed assets + Depreciation



# Total Cash Flow of the U.S.C.C.

## U.S. COMPOSITE CORPORATION

Financial Cash Flow  
20X2  
(in \$ millions)

|   |             |  |
|---|-------------|--|
| <b>Cash Flow of the Firm</b>  |             |  |
| Operating cash flow   | \$238       |  |
| (Earnings before interest and taxes<br>plus depreciation minus taxes)             | (173)       | <b><u>Capital Spending</u></b>               |
| Capital spending<br>(Acquisitions of fixed assets<br>minus sales of fixed assets) |             | Ending net fixed assets<br>\$1,118           |
| Additions to net working capital  | (23)        | Beginning net fixed assets<br><u>(1,035)</u> |
| Total   | <u>\$42</u> | Depreciation 550 -460 = 90                   |
| <b>Cash Flow of Investors in the Firm</b>   |             |  |
| Debt  | \$36        | Capital Spending <u>\$173</u>                |
| (Interest plus retirement of debt<br>minus long-term debt financing)              |             |  |
| Equity  | 6           |  |
| (Dividends plus repurchase of<br>equity minus new equity financing)               |             |  |
| Total   | <u>\$42</u> |  |



## Third Step: Change in Net Working Capital

- Cash flow can also be used for making investment in Net Working Capital.
- Net working capital is current assets minus current liabilities.
- The increase in net working capital means the use of cash flow.
  - The increase (decrease) in current assets (liabilities) means the use of cash flow.
  - The decrease (increase) in current assets (liabilities) means the source of cash flow.





# The Balance Sheet of the U.S.C.C.

$$\$252m = \$707 - \$455$$

|                      | 2010  | 2009  |                           | 2010  | 2009  |
|----------------------|-------|-------|---------------------------|-------|-------|
| Current assets:      |       |       | Current Liabilities:      |       |       |
| Cash and equivalents | \$140 | \$107 | Accounts payable          | \$213 | \$197 |
| Accounts receivable  | 294   | 270   | Notes payable             | 50    | 53    |
| Inventories          | 269   | 280   | Accrued expenses          | 223   | 205   |
| Other                | 58    | 50    | Total current liabilities | \$486 | \$455 |
| Total current assets | \$761 | \$707 |                           |       |       |

$$\$275m = \$761m - \$486m$$

Here we see NWC grow to \$275 million in 2010 from \$252 million in 2009.

\$23 million

This increase of \$23 million is an investment of the firm.



# Total Cash Flow of the U.S.C.C.

## U.S. COMPOSITE CORPORATION

### Financial Cash Flow 20X2 (in \$ millions)

|  |             |  |
|--|-------------|--|
| <b>Cash Flow of the Firm</b>                                       |             |  |
| Operating cash flow  | \$238       | <b>NWC grew from \$275 million in 20X2 from \$252 million in 20X1.</b> |
| (Earnings before interest and taxes plus depreciation minus taxes) |             |  |
| Capital spending   | (173)       |  |
| (Acquisitions of fixed assets minus sales of fixed assets)         |             | <b>This increase of \$23 million is the addition to NWC.</b>           |
| Additions to net working capital                                   | (23)        |  |
| <b>Total</b>   | <b>\$42</b> |  |
| <b>Cash Flow of Investors in the Firm</b>                          |             |  |
| Debt   | \$36        |  |
| (Interest plus retirement of debt minus long-term debt financing)  |             |  |
| Equity   | 6           |  |
| (Dividends plus repurchase of equity minus new equity financing)   |             |  |
| <b>Total</b>   | <b>\$42</b> |  |



# Total Cash Flow of the U.S.C.C.

## U.S. COMPOSITE CORPORATION

### Financial Cash Flow

20X2

(in \$ millions)

#### Cash Flow of the Firm

Operating cash flow \$238

(Earnings before interest and taxes  
plus depreciation minus taxes)

Capital spending (173)

(Acquisitions of fixed assets  
minus sales of fixed assets)

Additions to net working capital (23)

Total \$42

**Total Cash Flow of the Firm/  
Free Cash Flow from the  
Assets**

#### Cash Flow of Investors in the Firm

Debt \$36

(Interest plus retirement of debt  
minus long-term debt financing)

Equity 6

(Dividends plus repurchase of  
equity minus new equity financing)

Total \$42



# Cash Flow Paid to Creditors

- Cash flow paid to creditors is interest payments plus repayments of principal (that is, retirement of debt).
- Two methods to calculate
  - Income Statement and Balance Sheet:
    - Interest expense – Net new borrowing = Interest paid – (Ending long-term debt – Beginning long-term debt)
  - Income Statement and Statement of Cash Flow:
    - Interest expense – (Proceeds from long-term debt – Retirement of long-term debt)



# Total Cash Flow of the U.S.C.C.

## U.S. COMPOSITE CORPORATION

### Financial Cash Flow

20X2

(in \$ millions)

| <b>Cash Flow of the Firm</b>  |                    | <b>Cash Flow to Creditors</b>   |                              |
|---|--------------------|---------------------------------|------------------------------|
| <b>Operating cash flow</b>  | <b>\$238</b>       | <b>Interest</b>                 | <b>\$49</b>                  |
| (Earnings before interest and taxes<br>plus depreciation minus taxes) |                    | <b>Ending long term debt</b>    | <b>471</b>                   |
| <b>Capital spending</b>   | <b>(173)</b>       | <b>Beginning long term debt</b> | <b>458</b>                   |
| (Acquisitions of fixed assets<br>minus sales of fixed assets)         |                    | <b>Total</b>                    | <b>36 = 49 - (471 - 458)</b> |
| <b>Additions to net working capital</b>                               | <b>(23)</b>        |                                 |                              |
| <b>Total</b>  | <b><u>\$42</u></b> |                                 |                              |
| <b>Cash Flow of Investors in the Firm</b>                             |                    |                                 |                              |
| <b>Debt</b>   | <b>\$36</b>        |                                 |                              |
| (Interest plus retirement of debt<br>minus long-term debt financing)  |                    |                                 |                              |
| <b>Equity</b>   | <b>6</b>           |                                 |                              |
| (Dividends plus repurchase of<br>equity minus new equity financing)   |                    |                                 |                              |
| <b>Total</b>  | <b><u>\$42</u></b> |                                 |                              |



# Cash Flow Paid to Stockholders

- Cash flow paid to stockholders = Dividends – (Stock sold – Stock repurchased)
- Two methods to calculate stock sold and repurchased
  - Balance Sheet:
    - Stock sold = change in the common stock and capital surplus
    - Stock repurchased = change in the treasury stock
  - Statement of Cash Flow:
    - Stock issue and repurchased can be directly obtained



# Total Cash Flow of the U.S.C.C.

## U.S. COMPOSITE CORPORATION

Financial Cash Flow  
20X2  
(in \$ millions)

|   |                    |   |
|---|--------------------|---|
| <b>Cash Flow of the Firm</b>  |                    | <b><u>Cash Flow to Stockholders</u></b>               |
| <b>Operating cash flow</b>  | \$238              | <b>Dividends</b> \$43                                 |
| (Earnings before interest and taxes<br>plus depreciation minus taxes) |                    | <b>Repurchase of<br/>stock</b> 6                      |
| <b>Capital spending</b>   | (173)              | <b>Cash to Stockholders</b> 49                        |
| (Acquisitions of fixed assets<br>minus sales of fixed assets)         |                    | <b>Proceeds from new<br/>stock issue</b> <u>(43)</u>  |
| <b>Additions to net working capital</b>                               | <u>(23)</u>        | <b>Total</b> \$6                                      |
| <b>Total</b>  | <u><u>\$42</u></u> | <b>Change in the treasury<br/>stock = 6 = 26 - 20</b> |
| <b>Cash Flow of Investors in the Firm</b>                             |                    | <b>Change in the common<br/>stock and the capital</b> |
| <b>Debt</b>   | \$36               | <b>surplus = 43 = (55 - 32) +<br/>(347 - 327)</b>     |
| (Interest plus retirement of debt<br>minus long-term debt financing)  |                    |   |
| <b>Equity</b>   | 6                  |   |
| (Dividends plus repurchase of<br>equity minus new equity financing)   |                    |   |
| <b>Total</b>  | <u><u>\$42</u></u> |   |



# Total Cash Flow of the U.S.C.C.

## U.S. COMPOSITE CORPORATION

Financial Cash Flow  
20X2  
(in \$ millions)

|  |             |   |
|--|-------------|---|
| <b>Cash Flow of the Firm</b>   |             |   |
| Operating cash flow<br>(Earnings before interest and taxes<br>plus depreciation minus taxes) | \$238       | The cash received<br>from the firm's assets<br>must equal the cash<br>flows to the firm's<br>creditors and<br>stockholders: |
| Capital spending<br>(Acquisitions of fixed assets<br>minus sales of fixed assets)            | (173)       |   |
| Additions to net working capital   | (23)        |   |
| <b>Total</b>   | <b>\$42</b> |   |
| <b>Cash Flow of Investors in the Firm</b>  |             |   |
| Debt<br>(Interest plus retirement of debt<br>minus long-term debt financing)                 | \$36        | $CF(A) \equiv$<br>$CF(D) + CF(E)$   |
| Equity<br>(Dividends plus repurchase of<br>equity minus new equity financing)                | 6           |   |
| <b>Total</b>   | <b>\$42</b> |   |





# The Statement of Cash Flows

- There is an official accounting statement called the statement of cash flows.
- This helps explain the change in accounting cash.
- The three components of the statement of cash flows are:
  - Cash flow from operating activities
  - Cash flow from investing activities
  - Cash flow from financing activities



# The Statement of Cash Flows

## U.S. COMPOSITE CORPORATION Cash Flow from Operating Activities (\$ in millions)

|  |              |
|--|--------------|
| Net income                                 | \$86         |
| Depreciation                               | 90           |
| Deferred taxes                             | 13           |
| Change in assets and liabilities           |              |
| Accounts receivable                        | -24          |
| Inventories                                | 11           |
| Accounts payable                           | 16           |
| Accrued expense                            | 18           |
| Other                                      | -8           |
| <b>Cash flow from operating activities</b> | <b>\$202</b> |



# The Statement of Cash Flows

## U.S. COMPOSITE CORPORATION Cash Flow from Investing Activities (\$ in millions)

|  |               |
|--|---------------|
| Acquisition of fixed assets                | -\$198        |
| Sales of fixed assets                      | 25            |
| <b>Cash flow from investing activities</b> | <b>-\$173</b> |



# The Statement of Cash Flows

## U.S. COMPOSITE CORPORATION Cash Flow from Financing Activities (\$ in millions)

|  |            |
|--|------------|
| Retirement of long-term debt               | -\$73      |
| Proceeds from long-term debt sales         | 86         |
| Change in notes payable                    | 3          |
| Dividends                                  | -43        |
| Repurchase of Stock                        | -6         |
| Proceeds from new stock issue              | 43         |
| <b>Cash flow from financing activities</b> | <b>\$4</b> |



# The Statement of Cash Flows

## U.S. COMPOSITE CORPORATION Statement of Cash Flows (\$ in millions)

|   |        |
|---|--------|
| Total cash flow from operations           | \$202  |
| Total cash flow from investing activities | -\$173 |
| Total cash flow from financing activities | \$4    |
| Change in cash (on the balance sheet)     | \$33   |



# Quick Review

■ Total cash flow of the firm, which is used to calculate the firm's value can be obtained using the following formula,

➤ Total cash flow = operating cash flow – capital spending – change in net working capital,

➤ Operating cash flow = Earnings before interest and taxes - taxes + depreciation

■ The total cash flow of the firm can be calculated using only the balance sheet and income statement.

■ Interest expense is not in the statement of cash flow. It should be careful to use the statement of cash flow to compute total cash flow of the firm

