

# Corporate Finance

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# Chapter 1 Introduction to Corporate Finance

## 1. Balance-sheet model of the firm:

- I. **left-hand side of the sheet:** in what long-lived assets should the firm invest? – **capital budget**.
- II. **Right-hand side:** how can the firm raise cash for required capital expenditures? – **capital structure**.
- III. **Net working capital** = current asset – current liabilities: how should short-term operating cash flows be managed?

2. a firm sold gold for \$10 and has yet to collect from the customer. The cost is \$9:  
Income statement:

Accounting view: profit = 10-9=1

**Corporate finance view:** cash inflow = 0; cash outflow = -9.

## 3. the sole proprietorship\

- I. it is the cheapest business to form.
- II. It pays no corporate income taxes. All profits of the business are taxed as individual income.
- III. It has unlimited liability for business debts and obligations. No distinction is made b/w personal and business assets.

## 4. the partnership:

- I. Partnerships are usually inexpensive and easy to form.
- II. General partners have unlimited liability for all debts. The general partnership is terminated when a general partner dies or withdraws. It is difficult for a partnership to transfer ownership without dissolving.

The advantage is the cost of getting started. The disadvantages are: 1) unlimited liability, 2) limited life of the enterprise, and 3) difficulty of transferring ownership. These three disadvantages lead to 4) the difficulty of raising cash.

5. **the corporation:** limited liability, ease of ownership transfer, and perpetual succession are the major advantages; Disadvantage: government taxes corporate income.

6. **agency costs:** the cost of resolving the conflicts of interest b/w managers and shareholders are special types of costs.

**Residual losses** are the lost wealth of the shareholders due to divergent behavior of the managers.

7. G. Donaldson concluded that managers are influenced by **two basic motivations:**

- I. **survival**.
- II. **Independence and self-sufficiency:** this is the freedom to make decisions without encountering external parties or depending on outside financial markets. The Donaldson interviews suggested that **managers do not like to issue new shares of stock**. Instead, they like to be able to rely on internally generated cash flow.
- III. Therefore, **the basic financial objective of managers:** the maximization of corporate wealth. Corporate wealth is that wealth over which management has effective control. Corporate wealth is not necessarily shareholder wealth.

8. several control devices used by shareholders bond management to the self-interest of shareholders:
  - I. **shareholders control the directors**, who in turn select the management team;
  - II. **contracts with management and arrangements for compensation**, such as stock option plans, can be made so that management has an incentive to pursue the goal of the shareholders.
  - III. **Fear of a takeover** gives managers an incentive to take actions that will maximize stock prices.
  - IV. **Competition in the managerial labor market** may force managers to perform in the best interest of stockholders.

The available evidence and theory are consistent with the ideas of shareholder control and shareholder value maximization.
9. **Secondary markets:**
  - I. **Auction market:** the equity securities of most large US firms trade in organized auction markets. E.g. NYSE
  - II. Most debt securities are traded in **dealer markets**. Some stocks are traded in the dealer markets. When they are, it is referred to as the OTC market. E.g. NASDAQ

## Chapter 2 Accounting Statements and Cash Flow

1. **Balance sheet:**
  - I. The **assets** in the balance sheet are listed **in order by the length of time** it normally would take an ongoing firm to convert them to cash.
  - II. **The liabilities and the stockholders' equity** are listed in the order in which they must be paid.

<b>Assets</b>	<b>Liabilities and Stockholders' equity</b>
<b>Current assets</b>	<b>Current liabilities</b>
cash and equivalents	account payable
accounts receivable	notes payable
inventories and other	accrued expenses
Total current assets	Total current liabilities
<b>Fixed assets</b>	<b>Long-term liabilities</b>
property, plant and equipment	deferred taxes
Less accumulated depreciation	Long-term debt
Net property, plant and equipment	Total Long-term liabilities
intangible assets and others	<b>Stockholders' equity</b>
Total fixed assets	preferred stock
	common stock
	capital surplus
	accumulated retained earnings
	Less treasury stock
	Total equity
<b>Total assets</b>	<b>Total Liabilities and Stockholders'</b>

	<b>equity</b>
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- III. The more liquid a firm's assets, the less likely the firm is to experience problems meeting short-term obligations. But liquid assets frequently have lower rates of return than fixed assets.

2. **Income statement:**

Income statement
<b>Total operating revenues</b>
(cost of goods sold)
(selling, general, and administrative expenses)
(depreciation)
<b>Operating income</b>
Other income
<b>Earnings before interest and taxes (EBIT)</b>
(Interest expense)
<b>Pretax tax income</b>
(Taxes)
Current:
Deferred:
<b>Net income</b>
Retained earnings:
Dividends:

3. **noncash items:** depreciation and deferred taxes. They appear in income statement according to GAAP, but they are not cash outflows.
4. the **statement of cash flows:** helps to explain the change in accounting cash and equivalents.

<b>Statement of cash flows</b>
Operations
Net income
Depreciation
Deferred taxes
Changes in current assets and liabilities (other than cash)
<b>Total cash flow from operations</b>
Investing activities
Acquisition of fixed assets
Sales of fixed assets
<b>Total cash flow from investing activities</b>
<b>Total cash flow from Financing activities</b>
<b>Change in cash ( on the balance sheet)</b>

The difference b/w cash flow from Financing activities and total cash flow of the firm is interest expense.

5. the cash flows generated from the firm's assets = the cash flows to the firm's creditors and equity investors.

$$\text{CASH FLOW(A)} = \text{CASH FLOW(B)} + \text{CASH FLOW(S)}$$

Financial Cash flow/ free cash flow / total cash flow	
Cash flow of the firm	Cash flow to investors in the firm
Operating cash flow (EBIT + depreciation – taxes)	Debt (interest + retirement of debt – long-term debt financing)
(Capital spending) (acquisitions of fixed assets - sales of fixed assets)	Equity (dividends + repurchase of equity – new equity financing)
(addition to net working capital)	
Total =====	Total

6. Financial ratios:

- I. **short-term solvency:** the ability of the firm to meet its short-run obligations.
  - a. **current ratio** = total current assets/ total current liabilities.
  - b. **Quick ratio** = quick assets/ total current liabilities.
- II. **activity:** the ability of the firm to control its investment in assets. The idea is to find out how effectively assets are used to generate sales.
  - a. **total asset turnover** = total operating revenues/ total assets(average)
  - b. **receivables turnover** = total operating revenues/Receivables (average)  
**average collection period** = Days in period/Receivables turnover
  - c. **inventory turnover** = cost of goods sold/inventory(average)  
**days in inventory** = Days in period/inventory turnover
- III. **Financial leverage:** the extent to which a firm relies on debt financing.
  - a. **debt ratios:** **debt ratio** = debt/assets; **debt-to-equity ratio;** **equity multiplier** = assets/ equity.
  - b. **Interest coverage** = EBIT/ interest expense
- IV. **Profitability:** the extent to which a firm is profitable. Problems: current profits can be a poor reflection of true future profitability. Accounting-based measures of profitability ignore risk and do not give us a benchmark for making comparisons.
  - a. **profit margin:** net (gross) profit margin= net income (EBIT)/ total operating revenues
  - b. **net (gross) ROA** = net income (EBIT)/average total assets.  
 ROA = profit margin x asset turnover
  - c. **ROE** = net income/ average stockholders' equity  
 ROE = profit margin x asset turnover x equity multiplier
  - d. **Payout ratio** = cash dividends/net income
  - e. **Retention ratio** = retained earnings/net income
- V. **Sustainable growth rate** = ROE x retention ratio. It is the maximum rate of growth a firm can maintain w/o increasing its financial leverage and using internal equity only.
- VI. **Value:** the value of the firm.

- a. **P/E ratio**
- b. **Dividend yield** = dividend per share/ market price per share.  
Firms with high growth prospects will generally have lower dividend yields.
- c. **Market-to-book value**
- d. **Tobin's Q** = the market value of all the debt + equity/ the replacement value of the assets. If a firm has a Q ratio above 1 it has an incentive to invest that is probably greater than a firm with a Q ratio below 1. Firms with high Q ratios tend to be those firms with attractive investment opportunities or a significant competitive advantage.

## Chapter 3 Financial Markets and NPV: First Principles of Finance

1. Financial markets exist b/c people want to adjust their consumption over time. They do this by borrowing and lending.
2. The **financial markets provide a benchmark** against which proposed investments can be compared, and **the interest rate is the basis for a test that any proposed investment must pass**. The financial markets give the individual, the corporation, or even the government a standard of comparison for economic decisions.
3. Regardless of the individual's preference for consumption this year versus the next, regardless of how patient or impatient the individual is, **making the proper investment decision depends only on comparing it with the alternatives in the financial markets**.
4. Not only does the NPV rule tell us which investments to accept and which to reject, the financial markets also provide us with the tools for actually acquiring the funds to make the investments. In short, we use the financial markets to decide both what to do and how to do it.

## Chapter 4 Net Present Value

1. A useful formula

$$A = a + aq + aq^2 + aq^3 + \dots + aq^n \quad (1)$$

$$qA = aq + aq^2 + aq^3 + \dots + aq^n + aq^{n+1} \quad (2)$$

(1) - (2) :

$$A = \frac{a - aq^{n+1}}{1 - q} = \frac{a - q * aq^n}{1 - q}$$

Let  $A_1 = a$  , the first term;  $A_L = aq^n$  , the last term, then

$$A = \frac{A_1 - q * A_L}{1 - q} \quad (3)$$

If  $|q| < 1$ , then when  $n \rightarrow \infty$ ,  $A_L = aq^n = 0$ , then

$$A = \frac{A_1}{1 - q} \quad (4)$$

## 2. Applications of the formula

Equation (3) is the basis for nearly all the basic formula we have known.

### I. Perpetuity.

$A_1 = \frac{c}{1+r}$ ,  $q = \frac{1}{1+r} < 1$ ,  $A_L = aq^n = 0$ , put them into (4), we get:  $A = \frac{c}{r}$ .

### II. Annuity

$A_1 = \frac{c}{1+r}$ ,  $q = \frac{1}{1+r} < 1$ ,  $A_L = \frac{c}{(1+r)^T}$ , plug them into (3), we get:

$$A = \frac{c}{r} \left( 1 - \frac{1}{(1+r)^T} \right)$$

### III. Growing annuity

$A_1 = \frac{c}{1+r}$ ,  $q = \frac{1+g}{1+r}$ ,  $A_L = \frac{c(1+g)^{T-1}}{(1+r)^T}$ , Plug them into (3), we get:

$$A = \frac{c}{r-g} \left( 1 - \left( \frac{1+g}{1+r} \right)^T \right)$$

## Chapter 5 How to Value Bonds and Stocks

1. Pure discount bonds (zero coupon, bullet); level-coupon bonds; consol (a perpetuity).
2. an estimate of the growth rate of a stock **g = Retention ratio x Return on retained earnings.**
3. dividend-growth model:  $P = \text{Div}/(r - g)$
4. NPVGO model:  $P = \text{EPS}/r + \text{NPVGO}$
5. **only dividends** reach the stockholders and only they, **not earnings, should be discounted to obtain share price.**

6. P/E ratio is a function of three factors:
  - I. The per share amount of the firm's valuable growth opportunities. Firms with many growth opportunities have high P/E.
  - II. The risk of the stock. **The higher the risk, the lower the P/E.**
  - III. The type of accounting method used by the firm. **Firms with conservative accountants have high P/E.**

## Chapter 6 Some Alternative Investment Rules

1. NPV has three attributes:
  - I. NPV uses cash flows instead of earnings;
  - II. NPV uses all the cash flows of the project;
  - III. NPV discounts the cash flows properly.
2. **Payback period rule:**

It doesn't consider the timing of the cash flows within the payback period; it ignores all cash flows occurring after the payback period; Arbitrary standard for payback period.
3. **Average accounting rule = average project earnings after taxes and depreciation/average book value of the investment during its life.**

It uses net income instead of cash flow; AAR takes no account of timing; AAR offers no guidance on what the right-targeted rate of return should be.
4. IRR always reaches the same decision as NPV in the normal case where the initial outflows of an independent investment project are only followed by a series of inflows.
5. Problems of IRR:
  - I. Some projects have cash inflows followed by one or more cash outflows. IRR rule is inverted here: one should accept when the IRR is below the discount rate.
  - II. Some projects have **a number of changes of sign** in their cash flows. Here, there are likely to be multiple internal rates of return. The practitioner must use NPV here.
6. For mutually exclusive projects:

Either due to differences in size or in timing, the project with the highest IRR need not have the highest NPV. Hence, the IRR rule should not be applied. However, we can calculate incremental cash flows.
7. **Profitability index** =  $\text{PV of cash flows subsequent to initial investment} / \text{initial investment}$ 
  - I. Accept an independent project if  $\text{PI} > 1$ ; Reject if  $\text{PI} < 1$
  - II. PI ignores differences of scale for mutually exclusive projects;



- III. Capital rationing: in the case of limited funds, we cannot rank projects according to their NPVs. Instead, we should rank them according to PI rule.

## Chapter 7 NPV and Capital Budgeting

1. In calculating the NPV of a project, only cash flows that are incremental to the project should be used. We are interested in the difference b/w the cash flows of the firm with the project and the cash flows of the firm w/o the project;
2. We should **ignore sunk costs**, which are not incremental cash outflows. Once the company incurred the expense, the cost became irrelevant for any future decision.
3. Take **opportunity costs and side effects** into account. **The most important side effect is erosion.** Erosion is the cash flow transferred to a new project from customers and sales of other products of the firm.
4. There are two sets of books: one for the IRS (**the tax books**) and another for its annual report (**the stockholders' books**). The tax books follow the rules of the IRS. The stockholders' books follow the rules of the Financial Accounting Standards Board (FASB). The two sets of rules differ widely in certain areas. For example, income on municipal bonds is ignored for tax purposes while being treated as income by the FASB. **We are interested in the IRS rules. Our purpose is to determine net cash flow, and tax payments are a cash outflow.** The FASB regulations determine the calculation of accounting income, not cash flow.
5. An investment in NWC arises whenever (1) raw materials and other inventory are purchased prior to the sale of finished goods, (2) cash is kept in the project as a buffer against unexpected expenditures, and (3) credit sales are made, generating accounts receivable rather than cash. This **investment in NWC represents a cash outflow**; b/c cash generated elsewhere in the firm is tied up in the project.
6. In the real world, firms typically calculate a project's cash flows under the assumption that the project is financed only with equity. Any adjustments for debt financing are reflected in the discount rate, not the cash flows.
7. Real interest rate =  $(1 + \text{nominal interest rate}) / (1 + \text{inflation rate}) - 1$
8. **Nominal cash flows must be discounted at the nominal rate.** Real cash flows must be discounted at the real rate. **Both methods must always give the same NPV.**
9. When a firm must choose b/w two machines of unequal lives, the firm can apply either the **matching cycle approach** or the **equivalent annual cost approach**.

Since both approaches are different ways of presenting the same info, the same machine must be preferred under both approaches.

## Chapter 8 Strategy and Analysis in Using NPV

1. **Standard sensitivity analysis** calls for an NPV calculation for all the possibilities of a single variable, along with the expected forecast for all other variables. **(Modify only one variable at a time)**
2. **Scenario analysis** considers the joint movement of the different factors under different scenarios (e.g. war breaking out or oil prices skyrocketing)
3. **Break-even analysis** is frequently performed on an accounting profit basis, a NPV basis more appropriate. Break-even analysis only works with the expected or best estimates of these variables.
4. There are often **hidden options** in doing discounted cash flow analysis of capital budgeting. Both option to expand and option to abandon have values.

## Chapter 9 Capital Market Theory

5. The returns that shareholders can expect to obtain in the capital markets are the ones they will require from firms when the firms evaluate risky investment projects. The shareholders' required return is the firm's cost of equity capital.
6. In a world where (a) a project has the same risk as the firm, and (b) the firm has no debt, the expected return on the stock should serve as the project's discount rate, which can be taken from CAPM.

## Chapter 10 Return and Risk: CAPM

1. An individual who **holds one (only one) security** should use expected return as the measure of the security's return. **Standard deviation or variance is the proper measure of the security's risk.** An individual who **holds a diversified portfolio** cares about the contribution of each security to the expected return and the risk of the portfolio. Neither the security's variance nor the security's standard deviation is an appropriate measure of a security's contribution to the risk of a portfolio. **The contribution of a security to the risk of a portfolio is best measured by beta.**