КАФЕДРА ЭКОНОМИКИ И УПРАВЛЕНИЯ

Основы финансового менеджмента

ТЕОРЕТИЧЕСКИЕ АСПЕКТЫ

Учебно-методические материалы
на английском языке
для студентов ФГБОУ ВПО «НГЛУ», обучающихся
по направлению *080100.62 Экономика*
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Предисловие

Сегодня многие крупные российские компании перешли на международные стандарты финансовой отчетности, в которой принята терминология на английском языке. Но и руководители тех предприятий, которые официально работают в рамках российских стандартов, оперируют такими понятиями как EBITDA, ROIC, EVA и др., зачастую являющимися ключевыми показателями, ориентирами для стратегии и тактики предприятия.

При этом в рамках курса «Финансовый менеджмент» на русском языке данные понятия не изучаются, а на занятиях по практике делового английского языка мало внимания уделяется содержанию самих понятий.

Так появилась идея создания учебно-методических материалов по финансовому менеджменту на английском языке.

В предлагаемых студентам учебно-методических материалах «Основы финансового менеджмента» раскрываются базовые положения и понятия теории финансового менеджмента. В то же время материалы содержат много примеров, показывающих, как можно использовать теорию финансового менеджмента для решения практических задач.

Учебно-методические материалы составлены на основе фундаментального американского учебника профессора Стивена Росса «Корпоративные финансы»[1]. Данный учебник широко используется в преподавании финансового менеджмента в университетах США, Европы и других стран.

Учебно-методические материалы состоят из четырех глав, каждая, в свою очередь, содержит несколько разделов:

1. Accounting statements and cash flows
2. Financial statement analysis
3. Capital budgeting analysis
4. Management of capital

Для более глубокого усвоения понятий и положений теории финансового менеджмента составители данных учебно-методических материалов рекомендуют студентам выполнить практические задания, выпущенные отдельным изданием.

Таким образом, успешное овладение материалами поможет студентам, с одной стороны, расширить свой словарный запас английского языка, с другой – понять специфику финансового менеджмента в США и Европе.

Учебно-методические материалы могут быть использованы как для аудиторной, так и для самостоятельной работы студентов.

[1] Ross, Westerfield and Jafee (2009) Corporate Finance 9th Edition, New-York: McGraw-Hill/Irwin

Оглавление

Chapter 1. ACCOUNTING STATEMENTS AND CASH FLOWS

Financial statements are the medium by which a company discloses information concerning its financial performance. The quantitative information gleaned from financial statements is used to make investment decisions by the followers of fundamental analysis. The three most important financial statements are income statements, balance sheets and cash flow statements.

1.1. The Balance Sheet

The **balance sheet** is an accountant's snapshot of the firm's accounting value on a particular date. The balance sheet has two sides: on the left are the *assets* and on the right are the *liabilities* and *stockholders' equity.* The balance sheet states what the firm owns and how it is financed. The accounting definition that underlies the balance sheet and describes the balance is:

Assets = Liabilities + Stockholders' equity.

We have put a three-line equality in the balance equation to indicate that it must always hold, by definition. In fact, the stockholders' equity is *defined* to be the difference between the assets and the liabilities of the firm. In principle, equity is what the stockholders would have remaining after the company discharged its obligations.

Assets	**Liabilities and Stockholders' equity**
Current assets	**Current liabilities**
Cash and equivalents	Accounts payable
Accounts receivable	Notes payable
Inventories and other	Accrued expenses
Total current assets	*Total current liabilities*
Fixed assets	**Long-term liabilities**
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	**Stockholders' equity**
Total fixed assets	Preferred stock
	Common stock
	Capital surplus
	Accumulated retained earnings
	Less treasury stock
	Total equity
Total assets	**Total Liabilities and Stockholders' equity**

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. The asset side depends on the nature of the business and how management chooses to conduct it.

The liabilities and the stockholders' equity are listed in the order in which they must be paid.

When analyzing a balance sheet, the financial manager should be aware of three concerns: accounting liquidity, debt versus equity, and value versus cost.

Accounting Liquidity

Accounting liquidity refers to the ease and quickness with which assets can be converted to cash. Current assets are the most liquid and include cash and those assets that will be turned into cash within a year from the date of the balance sheet. Accounts receivable are amounts not yet collected from customers for goods or services sold to them (after adjustment for potential bad debts). Inventory is composed of raw materials to be used in production, work in process, and finished goods. Fixed assets are the least liquid kind of assets.

Tangible fixed assets include property, plant, and equipment. These assets do not convert to cash from normal business activity, and they are not usually used to pay expenses, such as payroll.

Intangible assets have no physical existence but can be very valuable. Examples of intangible assets are the value of a trademark or the value of a patent.

The more liquid a firm's assets, the less likely the firm is to experience problems meeting short-term obligations. Thus, the probability that a firm will avoid financial distress can be linked to the firm's liquidity. Unfortunately, liquid assets frequently have lower rates of return than fixed assets; for example, cash generates no investment income. To the extent a firm invests in liquid assets, it sacrifices an opportunity to invest in more profitable investment vehicles.

Debt versus Equity

Liabilities are obligations of the firm that require a payout of cash within a stipulated time period. Many liabilities involve contractual obligations to repay a stated amount and interest over a period. Thus, liabilities are debts and are frequently associated with nominally fixed cash burdens, called debt service, that put the firm in default of a contract if they are not paid. Stockholders' equity is a claim against the firm's assets that is residual and not fixed. In general terms, when the firm borrows, it gives the bondholders first claim on the firm's

cash flow. Bondholders can sue the firm if the firm defaults on its bond contracts. This may lead to the bankruptcy.

Value versus Cost

Market value is the price at which willing buyers and sellers trade the assets. It would be only a coincidence if accounting value and market value were the same. In fact, management's job is to create a value for the firm that is higher than its cost.

Sample Balance Sheet:

Example Company Balance Sheet
December 31, 2011

ASSETS		**LIABILITIES**	
Current Assets		**Current Liabilities**	
Cash	$ 2,100	Notes Payable	$ 5,000
Petty Cash	100	Accounts Payable	35,900
Temporary Investments	10,000	Wages Payable	8,500
Accounts Receivable - net	40,500	Interest Payable	2,900
Inventory	31,000	Taxes Payable	6,100
Supplies	3,800	Warranty Liability	1,100
Prepaid Insurance	1,500	Unearned Revenues	1,500
Total Current Assets	89,000	**Total Current Liabilities**	61,000
			-
Investments	36,000	**Long-term Liabilities**	
		Notes Payable	20,000
Property, Plant & Equipment		Bonds Payable	400,000
Land	5,500	**Total Long-term Liabilities**	420,000
Land Improvements	6,500		
Buildings	180,000		
Equipment	201,000	**Total Liabilities**	481,000
Less: Accum Depreciation	(56,000)		
Prop, Plant & Equip - net	337,000		
			-
Intangible Assets		**Stockholders' equity**	
Goodwill	105,000	Common Stock	110,000
Trade Names	200,000	Retained Earnings	229,000
Total Intangible Assets	305,000	Less: Treasury Stock	(50,000)
		Total Stockholders' Equity	289,000
Other Assets	3,000		
Total Assets	$770,000	**Total Liab. & Stockholders' Equity**	$770,000

1.2. Net Working Capital

Net working capital is current assets minus current liabilities. Therefore, a change in the total amount of current assets without a change of the same amount in current liabilities will result in a change in the amount of working capital. Similarly, a change in the total amount of current liabilities without an identical change in the total amount of current assets will cause a change in working capital.

Net Working Capital can be positive or negative depending on when raw material is paid to suppliers, how long the goods are in inventory and when goods are paid by customers.

For instance, if the owner makes an additional investment of $15,000 in her company, the company's total current assets will increase by $15,000 but there is no increase in its current liabilities. As a result, the company's working capital increases by $15,000. (The other change is an increase in the owner's capital account.)

If a company borrows $60,000 and agrees to repay the loan in 90 days, the company's working capital has not increased. The reason is that the current asset Cash increased by $60,000 and the current liability Loans Payable also increased by $60,000.

The use of $30,000 to buy merchandise for inventory will not change the amount of working capital. The reason is that the total amount of current assets will not change. The current asset Cash decreases by $30,000 and the current asset Inventory increases by $30,000.

If a company sells a product for $3,400, which is in its inventory at a cost of $2,500 the company's working capital will increase by $900. Working capital increased because 1) the current asset accounts Cash or Accounts Receivable will increase by $3,400 and Inventory will decrease by $2,500; 2) current liabilities will not change. Owner's equity will increase by $900.

The use of $100,000 for the construction of a storage building will reduce working capital because the current asset Cash decreased and a long-term asset Storage Building has increased.

Different business models require different amounts of working capital depending on things such as the need for different inventory, when customers pay and when suppliers are being paid. Companies with business models that can use cash from customers require less investment and can thus generate higher return on those investments. Companies with business models that need lots of working capital will have to raise it from somewhere and capital always comes at a price.

1.3. The Income Statement

The income statement measures performance over a specific period of time, say, a year. The accounting definition of income is:

Revenue – Expenses = Income.

The income statement usually includes several sections. The operations section reports the firm's revenues and expenses from principal operations. One number of particular importance is earnings before interest and taxes (EBIT), which summarizes earnings before taxes and financing costs. Among other things, the non-operating section of the income statement includes all financing costs, such as interest expense. Usually a second section reports the amount of taxes levied on income. The last item on the income statement is the bottom line, or net income. Net income is frequently expressed per share of common stock, that is, earnings per share.

The format of the income statement or the profit and loss statement will vary according to the complexity of the business activities. However, most companies will have the following elements in their income statements:

A. Revenues and Gains:

1. Revenues from primary activities (operating revenues);

2. Revenues or income from secondary activities;

3. Gains (e.g., gain on the sale of long-term assets, gain on lawsuits).

B. Expenses and Losses:

1. Expenses involved in primary activities;

2. Expenses from secondary activities;

3. Losses (e.g., loss on the sale of long-term assets, loss on lawsuits).

If the net amount of revenues and gains minus expenses and losses is positive, the bottom line of the profit and loss statement is labeled as **net income**. If the net amount (or bottom line) is negative, there is a **net loss**.

When analyzing an income statement, the financial manager should keep in mind GAAP. The matching principle of GAAP dictates that revenues be matched with expenses. Thus, income is reported when it is earned, or accrued, even though no cash flow has necessarily occurred (for example, when goods are sold for credit, sales and profits are reported).

1.4. Cash Flow Statement

The statement of cash flows represents a record of a business' cash inflows and outflows over a period of time. Typically, a statement of cash flows focuses on the following cash-related activities:

- Operating Cash Flow (OCF): Cash generated from day-to-day business operations;
- Cash from investing (CFI): Cash used for investing in assets, as well as the proceeds from the sale of other businesses, equipment or long-term assets;
- Cash from financing (CFF): Cash paid or received from the issuing and borrowing of funds.

The cash flow statement is important because it is very difficult for a business to manipulate its cash situation. There is plenty that aggressive accountants can do to manipulate earnings, but it is tough to fake cash in the bank. For this reason some investors use the cash flow statement as a more conservative measure of a company's performance.

The cash flow statement shows how much cash comes in and goes out of the company over the quarter or the year. At first glance, that sounds a lot like the income statement in that it records financial performance over a specified period. But there is a big difference between the two.

What distinguishes the two is accrual accounting, which is found on the income statement. Accrual accounting requires companies to record revenues and expenses when transactions occur, not when cash is exchanged. At the same time, the income statement, on the other hand, often includes non-cash revenues or expenses, which the statement of cash flows does not include.

Just because the income statement shows net income of $10 does not means that cash on the balance sheet will increase by $10. Whereas when the bottom of the cash flow statement reads $10 net cash inflow, that is exactly what it means. The company has $10 more in cash than at the end of the last financial period. You may want to think of net cash from operations as the company's "true" cash profit.

Because it shows how much actual cash a company has generated, the statement of cash flows is critical to understanding a company's fundamentals. It shows how the company is able to pay for its operations and future growth.

Indeed, one of the most important features you should look for in a potential investment is the company's ability to produce cash. Just because a company shows a profit on the income statement doesn't mean it cannot get into

trouble later because of insufficient cash flows. A close examination of the cash flow statement can give investors a better sense of how the company will fare.

Three Sections of the Cash Flow Statement

Companies produce and consume cash in different ways, so the cash flow statement is divided into three sections: cash flows from operations, financing and investing. Basically, the sections on operations and financing show how the company gets its cash, while the investing section shows how the company spends its cash.

Cash Flows from Operating Activities

This section shows how much cash comes from sales of the company's goods and services, less the amount of cash needed to make and sell those goods and services. Investors tend to prefer companies that produce a net positive cash flow from operating activities. High growth companies, such as technology firms, tend to show negative cash flow from operations in their formative years. At the same time, changes in cash flow from operations typically offer a preview of changes in net future income. Normally it is a good sign when it goes up. Watch out for a widening gap between a company's reported earnings and its cash flow from operating activities. If net income is much higher than cash flow, the company may be speeding or slowing its booking of income or costs.

Cash Flows from Investing Activities

This section largely reflects the amount of cash the company has spent on capital expenditures, such as new equipment or anything else that needed to keep the business going. It also includes acquisitions of other businesses and monetary investments such as money market funds.

You want to see a company re-invest capital in its business by at least the rate of depreciation expenses each year. If it doesn't re-invest, it might show artificially high cash inflows in the current year which may not be sustainable.

Cash Flow From Financing Activities

This section describes the goings-on of cash associated with outside financing activities. Typical sources of cash inflow would be cash raised by selling stock and bonds or by bank borrowings. Likewise, paying back a bank loan would show up as a use of cash flow, as would dividend payments and common stock repurchases.

Cash Flow Statement Considerations:

Savvy investors are attracted to companies that produce plenty of free cash flow (FCF). Free cash flow signals a company's ability to pay debt, pay dividends, buy back stock and facilitate the growth of business. Free cash flow,

which is essentially the excess cash produced by the company, can be returned to shareholders or invested in new growth opportunities without hurting the existing operations. The most common method of calculating free cash flow is:

Net Income + Amortization/Depreciation – Changes in Working Capital – Capital Expenditures = Free Cash Flow

Ideally, investors would like to see that the company could pay for the investing figure out of operations without having to rely on outside financing to do so. A company's ability to pay for its own operations and growth signals to investors that it has very strong fundamentals.

Chapter 2. FINANCIAL STATEMENT ANALYSIS

The aim of this chapter is to show how to rearrange information from financial statements into financial ratios that provide information about five areas of financial performance:

1. *Short-term solvency* — the ability of the firm to meet its short-run obligations.

2. *Activity* — the ability of the firm to control its investment in assets.

3. *Financial leverage* — the extent to which a firm relies on debt financing.

4. *Profitability* — the extent to which a firm is profitable.

5. *Value* — the value of the firm.

Financial statements cannot provide the answers to the preceding five measures of performance. However, management must constantly evaluate how well the firm is doing, and financial statements provide useful information.

2.1. Short-Term Solvency (Liquidity Ratios)

Ratios of short-term solvency measure the ability of the firm to meet recurring financial obligations (that is, to pay its bills). To the extent a firm has sufficient cash flow, it will be able to avoid defaulting on its financial obligations and, thus, avoid experiencing financial distress.

The most widely used measures of accounting liquidity are the current ratio and the quick ratio.

Current Ratio

Current Ratio is the ratio of current assets divided by current liabilities.

$$\text{Current ratio} = \frac{\text{Total current assets}}{\text{Total current liabilities}}$$

Current assets include cash and cash equivalents, accounts receivable, marketable securities, inventories, and prepaid expenses. Current liabilities include accounts payable, notes payable, salaries, taxes, current maturities of long-term obligations and other current accruals.

Example 1. Calculating Current Ratio

For its fiscal year ending December 31, 2011, Berry Corp. had total current assets of $ 200,000 and total current liabilities of $80, 000. What is its current ratio?

Current Ratio = 200,000 / 80,000 = 2.5

They had 2.5 times more current assets than current liabilities.

If a firm is having financial difficulty, it may not be able to pay its bills (accounts payable) on time or it may need to extend its bank credit (notes payable). As a consequence, current liabilities may rise faster than current assets and the current ratio may fall.

A low current ratio would imply possible insolvency problems. A very high current ratio might imply that management is not investing idle assets productively. Generally, we want to have a current ratio that is proportional to our operating cycle.

Of course, a firm's current ratio should be calculated over several years for historical perspective, and it should be compared to the current ratios of other firms with similar operating activities.

Acid Test or Quick Ratio

Certain current assets (such as inventories and prepaid expenses) may be difficult to convert into cash. If we remove such current assets from our previous calculation, we get Acid Test or Quick Ratio; i.e. assets that are quickly converted into cash (Quick assets) will be compared to current liabilities.

$$\text{Quick ratio} = \frac{\text{Quick assets}}{\text{Total current liabilities}}$$

The Acid Test Ratio measures our ability to meet current obligations based on the most liquid assets. The Acid Test Ratio is calculated by dividing the sum of our liquid assets by current liabilities.

Example 2. Calculating Acid Test Ratio

Cash – $ 5,000, Marketable Securities – $ 15,000, Accounts Receivable – $ 40,000, Current Liabilities – $ 80,000.

Acid Test Ratio = ($ 5,000 + $ 15,000 + $ 40,000) / $ 80,000 = 0.75.

We have $ 0.75 in liquid assets for each $ 1.00 in current liabilities.

Ratio of Operating Cash Flow to Current Debt Obligations

The Ratio of Operating Cash Flow to Current Debt Obligations puts emphasis on cash flows to meet fixed debt obligations. Current maturities of long-term debts along with notes payable comprise our current debt obligations. We can refer to the Statement of Cash Flows for operating cash flows.

The Ratio of Operating Cash Flow to Current Debt Obligations is calculated as follows:

$$\frac{\text{Operating Cash Flow}}{(\text{Current Maturity of Long Term Debt} + \text{Notes Payable})}$$

Example 3. Calculating The Operating Cash Flow to Current Debt Obligations Ratio

Operating cash flow – $ 100,000, notes payable – $ 20,000, current obligations related to our long-term debt – $ 5,000.

The Operating Cash Flow to Current Debt Obligations Ratio = $ 100,000 / ($ 20,000 + $ 5,000) = 4.0.

We have 4 times the cash flow to cover our current debt obligations.

2.2. Activity (Asset Management Ratios)

Ratios of activity measure how effectively the firm's recourses are being managed.

Total Asset Turnover measures the percent of sales you are able to generate from your assets. Asset Turnover reflects the level of capital we have tied-up in assets and how much sales we can extract from our assets. The total asset turnover ratio is determined by dividing total operating revenues for the accounting period (sales) by the average of total assets.

$$\text{Total asset turnover} = \frac{\text{Total operating revenues}}{\text{Total assets (average)}}$$

A high asset turnover rate means that we can generate strong sales from a relatively low level of capital. If the ratio is low, the firm is not using its assets to their capacity and must either increase sales or dispose of some of the assets.

Example 4. Calculating The Asset Turnover Rate

Sales for the year – $ 480,000, beginning total assets – $ 505,000, year-end total assets – $ 495,000.

The Asset Turnover Rate = $ 480,000 / $ 500,000 (which is $ 505,000 + $ 495,000 / 2) = 0.96.

For every $ 1.00 of assets, we were able to generate $ 0.96 of sales.

Receivables Turnover *(*Accounts Receivable Turnover*)*

Accounts Receivable Turnover measures the number of times we were able to convert our receivables over into cash. Higher turnover ratios are desirable.

The ratio of receivables turnover is calculated by dividing sales by average receivables during the accounting period.

$$\text{Accounts Receivable turnover} = \frac{\text{Total operating revenues}}{\text{Accounts Receivable (average)}}$$

Example 5. Calculating Accounts Receivable Turnover

Sales – $ 480,000, the average receivables during the year – $ 40,000, allowance for sales returns – $ 20,000.

Accounts Receivable Turnover = ($ 480,000 - $ 20,000) / $ 40,000 = 11.5.

We were able to turn our receivables over 11.5 times during the year.

NOTE. We are assuming that all of our sales are credit sales; i.e. we do not have any significant cash sales.

Days in Accounts Receivable

The Number of Days in Accounts Receivable is the average length of time required to collect our receivables. A low number of days is desirable. Days in Accounts Receivable is calculated as follows:

$$\text{Average collection period} = \frac{\text{Days in period (365 or 360)}}{\text{Accounts Receivable turnover}}$$

Example 6. Calculating Days in Accounts Receivable

Accounts Receivable Turnover – 11.5.

Average collection period = 365/11.5 = 32 days.

We need 32 days on average to collect our receivables.

Inventory Turnover

Inventory Turnover measures how many times we turn our inventory over during the year. Higher turnover rates are desirable. A high turnover rate implies that management does not hold onto excess inventories and our inventories are highly marketable. Inventory Turnover is calculated as follows:

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Inventory (average)}}$$

Example 7. Calculating Inventory Turnover

Cost of Sales – $ 192,000, the average inventory balance during the year – $ 120,000.

The Inventory Turnover Rate = 192,000/120,000 = 1.6

We were able to turn our inventory over 1.6 times during the year.

Days in Inventory

Days in Inventory is the average number of days we held our inventory before a sale; it is called shelf life for retail and wholesale trade firms. A low number of inventory days is desirable. A high number of days means that

management is unable to sell existing inventory stocks. Days in Inventory is calculated as follows:

$$\text{Days in inventory} = \frac{\text{Days in period (365 or 360)}}{\text{Inventory turnover}}$$

Example 8. Calculating Days in Inventory

The Inventory Turnover Rate – 1.6.

Days in Inventory = 365 / 1.6 = 228 days.

On average we are holding our inventories 228 days before a sale.

Operating Cycle

Now that we have calculated the number of days for receivables and the number of days for inventory, we can estimate our operating cycle. Operating Cycle = Number of Days in Receivables + Number of Days in Inventory. In our previous examples, this would be 32 + 228 = 260 days. So on average, it takes us 260 days to generate cash from our current assets.

Our turnover within the Operating Cycle is 365 / 260 or 1.40. This is lower than our Current Ratio of 2.5 from Example 1. This indicates that we have additional assets to cover the turnover of current assets into cash. If our current ratio were below that of the Operating Cycle Turnover Rate, this would imply that we do not have sufficient current assets to cover current liabilities within the Operating Cycle. We may have to borrow short-term to pay our expenses.

Capital Turnover

Capital Turnover measures our ability to turn capital over into sales. Remember, we have two sources of capital: Debt and Equity.

$$\text{Capital Turnover} = \frac{\text{Net Sales}}{\text{Interest Bearing Debt} + \text{Shareholders Equity}}$$

Example 9. Calculating Capital Turnover

Net Sales – $ 460,000, Debt – $ 50,000, Equity – $ 200,000.

Capital Turnover = $ 460,000 / ($ 50,000 + $ 200,000) = 1.84.

For each $ 1.00 of capital invested (both debt and equity), we are able to generate $ 1.84 in sales.

Debt Ratio

The Debt Ratio measures the level of debt in relation to our investment in assets. The Debt Ratio tells us the percent of funds provided by creditors and to what extent our assets protect us from creditors. A low Debt Ratio would

indicate that we have sufficient assets to cover our debt load. A low Debt Ratio is desirable for Creditors and management.

$$\text{Debt ratio} = \frac{\text{Total liabilities (debt)}}{\text{Total assets}}$$

Example 10. Calculating The Debt Ratio

Total Liabilities – $ 75,000, Total Assets – $ 500,000.
Debt Ratio = $ 75,000 / $ 500,000 = 0.15.
15% of our funds for assets come from debt.

Debt ratios provide information about protection of creditors from insolvency and the ability of firms to obtain additional financing for potentially attractive investment opportunities. However, debt is carried on the balance sheet simply as the unpaid balance. Consequently, no adjustment is made for the current level of interest rates (which may be higher or lower than when the debt was originally issued) or risk. Thus, the accounting value of debt may differ substantially from its market value. Some forms of debt may not appear on the balance sheet at all, such as pension liabilities or lease obligations.

Debt to Equity Ratio

Debt to Equity is the ratio of Total Debt to Total Equity. It compares the funds provided by creditors to the funds provided by shareholders. The more debt is used, the higher Debt to Equity Ratio is. Since we incur more fixed interest obligations with debt, risk increases. On the other hand, the use of debt can help improve earnings since we get to deduct interest expense on the tax return. So we want to balance the use of debt and equity to maximize our profits, but at the same time manage our risk. The Debt to Equity Ratio is calculated as follows:

$$\text{Debt to equity ratio} = \frac{\text{Total debt}}{\text{Total Shareholder's Equity}}$$

Example 11. Calculating The Debt to Equity Ratio

Total Liabilities – $ 75,000, total shareholders' equity – $ 200,000.
Debt to Equity Ratio = $ 75,000 / $ 200,000 = 0.375 or 37.5%
37.5% of our resources are in the form of debt.

As a general rule, it is advantageous to increase our use of debt (trading on the equity) if earnings from borrowed funds exceed the costs of borrowing.

2.3. Profitability

Profitability is difficult to conceptualize and to measure. In general, accounting profits are the difference between revenues and costs. Unfortunately, it is hard to say when a company is profitable. At best, a financial analyst can measure current or past accounting profitability. Many business opportunities, however, involve sacrificing current profits for future profits. For example, all new products require large start-up costs and produce low initial profits.

Thus, true future profitability can be poorly reflected by current profits. Another problem with accounting-based measures of profitability is that they ignore risk. It would be false to conclude that two firms with identical current profits were equally profitable if the risk of one was greater than the other.

The most important conceptual problem with accounting measures of profitability is they do not give us a benchmark for making comparisons. In general, a firm is profitable in the economic sense only if its profitability is greater than investors can achieve on their own in the capital markets.

Profitability Ratios measure the level of earnings in comparison to a base, such as assets, sales, or capital. Profitability ratios: Return on Equity, Profit Margin, Operating Income to Sales and Return on Assets.

Profit Margin

Profit Margin measures the percent of profits you generate for each dollar of sales. Profit Margin reflects your ability to control costs and make a return on your sales. Profit Margin is calculated by dividing Net Income by Sales. Management is interested in having high profit margins.

$$\text{Net profit margin} = \frac{\text{Net income}}{\text{Total operating revenue}}$$

$$\text{Gross profit margin} = \frac{\text{Earnings before interest and taxes}}{\text{Total operating revenues}}$$

Example 11. Calculating Profit Margin

Net Income for the year – $ 60,000, Sales – $ 480,000.
Profit Margin = $ 60,000 / $ 480,000 = 12.5%.
For each dollar of sales, we generated $ 0.125 of profits.

Profit margins are not direct measures of profitability because they are based on total operating revenue, not on the investment made in assets by the firm or the equity investors. Trade firms tend to have low margins and service firms tend to have high margins.

Return on Assets (ROA)

Return on Assets measures the net income returned on each dollar of assets. This ratio measures overall profitability from our investment in assets.

Higher rates of return are desirable. Return on Assets is calculated as follows:

$$\text{Net return on assets} = \frac{\text{Net income}}{\text{Average total assets}}$$

$$\text{Gross return on assets} = \frac{\text{Earnings before interest and taxes}}{\text{Average total assets}}$$

Example 12. Calculating ROA

Net Income – $ 60,000, average total assets for the year – $ 500,000.
Return on assets = $ 60,000 / $ 500.000 = 0.12 or 12%.

Some financial ratios can be linked together to compute ROA. One implication of this is usually referred to as the *DuPont system of financial control.* This system highlights the fact that ROA can be expressed in terms of the profit margin and asset turnover. The basic components of the system are as follows:

ROA = Profit margin × Asset turnover

$$\text{ROA (net)} = \frac{\text{Net income}}{\text{Total operating revenue}} \times \frac{\text{Total operating revenue}}{\text{Average total assets}}$$

$$\text{ROA (gross)} = \frac{\text{EBIT}}{\text{Total operating revenue}} \times \frac{\text{Total operating revenue}}{\text{Average total assets}}$$

Firms can increase ROA by increasing profit margins or asset turnover. Of course, competition limits their ability to do so simultaneously. Thus, firms tend to face a trade-off between turnover and margin. In retail trade, for example, mail-order outfits have low margins and high turnover, whereas high-quality jewelry stores have high margins and low turnover.

Return on Equity (ROE)

This ratio (ROE) is defined as net income (after interest and taxes) divided by average common stockholders' equity.

$$\text{ROE} = \frac{\text{Net income}}{\text{Average stockholders' equity}}$$

The most important difference between ROA and ROE is due to financial leverage. To see this, consider the following breakdown of ROE:

ROE = Profit margin × Asset turnover × Equity multiplier

$$= \frac{\text{Net income}}{\text{Total operating revenue}} \times \frac{\text{Total operating revenue}}{\text{Average total assets}} \times \frac{\text{Average total assets}}{\text{Average stockholders' equity}}$$

From the preceding numbers, it would appear that financial leverage always magnifies ROE. Actually, this occurs only when ROA (gross) is greater than the interest rate on debt.

Payout Ratio

The payout ratio is the proportion of net income paid out in cash dividends.

$$\text{Payout ratio} = \frac{\text{Cash dividends}}{\text{Net income}}$$

$$\text{Retention ratio} = \frac{\text{Retained earnings}}{\text{Net income}}$$

Retained earnings = Net income – Dividends

The Sustainable Growth Rate

One ratio that is very helpful in financial analysis is called the sustainable growth rate. It is the maximum rate of growth a firm can maintain without increasing its financial leverage and using internal equity only. The precise value of sustainable growth can be calculated as:

Sustainable growth rate = ROE × Retention ratio

2.4. Market Value Ratios

We can learn many things from a close examination of balance sheets and income statements. However, one very important characteristic of a firm that cannot be found on an accounting statement is its market value.

Market Price

The market price of a share of common stock is the price that buyers and sellers establish when they trade the stock. The market value of the common equity of a firm is the market price of a share of common stock multiplied by the number of shares outstanding.

Sometimes the words “fair market value” are used to describe market prices. *Fair market value* is the amount at which common stock would change hands between a willing buyer and a willing seller, both having knowledge of the relevant facts. Thus, market prices give guesses about the true worth of the

assets of a firm. In an efficient stock market, market prices reflect all relevant facts about firms, and thus market prices reveal the true value of the firm's underlying assets.

The market value of IBM is many times greater than that of Apple Computer. This may suggest nothing more than the fact that IBM is a bigger firm than Apple (hardly a surprising revelation). Financial analysts construct ratios to extract information that is independent of a firm's size.

Price-to-Earnings (P/E) Ratio

The relationship of the price of the stock in relation to Earnings per Share (EPS) is expressed as the Price to Earnings Ratio or P / E Ratio. Investors often refer to the P / E Ratio as a rough indicator of value for a company. A high P / E Ratio would imply that investors are very optimistic (bullish) about the future of the company since the price (which reflects market value) is selling for well above current earnings. A low P / E Ratio would imply that investors view the company's future as poor and thus, the price the company sells for is relatively low when compared to its earnings. The P / E Ratio is calculated as follows:

$$\text{P / E Ratio} = \frac{\textbf{Price of Stock}}{\textbf{Earnings per Share}}$$

Example 13. Calculating P / E Ratio

Earnings per share – $ 3.00, the stock is selling for $ 36.00 per share. The P / E Ratio = $ 36 / $ 3 = 12.

The company is selling for 12 times earnings.

Dividend Yield

The percentage of dividends paid to shareholders in relation to the price of the stock is called the Dividend Yield. For investors interested in a source of income, the dividend yield is important since it gives the investor an indication of how much dividends are paid by the company. Dividend Yield is calculated as follows:

$$\textbf{Dividend yield} = \frac{\textbf{Dividend per share}}{\textbf{Market price per share}}$$

Example 14. Calculating Dividend Yield

Dividends per share – $ 2.10, the price of the stock – $ 30.00 per share. The Dividend Yield = $ 2.10 / $ 30.00 = 7%.

Dividend yields are related to the market's perception of future growth prospects for firms. Firms with high growth prospects will generally have lower dividend yields.

Market-to-Book (M/B) Value and the Q ratio The market-to-book value ratio is calculated by dividing the market price per share by the book value per share.

Chapter 3. CAPITAL BUDGETING ANALYSIS

This chapter provides a concise overview of capital budgeting analysis, which addresses the issue of strategic long-term investment decisions. Capital budgeting can be defined as the process of analyzing, evaluating, and deciding whether resources should be allocated to a project or not. The process of capital budgeting ensure optimal allocation of resources and helps management work towards the goal of shareholder wealth maximization

3.1. Stages of capital budgeting analysis

Expenditure is called capital if it generates a cash flow for more than one year. For example, purchase of new equipment, expansion of production facilities, acquiring new technologies, etc. Capital expenditures often involve large cash outlays with major implications on the future values of the company. Additionally, once we commit to making a capital expenditure it is sometimes difficult to back out. Therefore, we need to carefully analyze and evaluate capital expenditures.

Given that Project A will return $1 mln. in 5 years. How should you be willing to pay to undertake the project today? The process entailed in answering this question is called capital budgeting and is at the heart of corporate decision-making.

How we spend our money today determines what our value will be tomorrow. Therefore, we will focus much of our attention on present values so that we can understand how expenditures today influence values in the future. A very popular approach to looking at present values of projects is discounted cash flows or DCF. However, we will learn that this approach is too narrow for properly evaluating a project. We will include three stages within Capital Budgeting Analysis:

- Decision Analysis for Knowledge Building
- Option Pricing to Establish Position
- Discounted Cash Flow (DCF) for making the Investment Decision

Stage 1: Decision-making

Decision-making is increasingly more complex today because of uncertainty. Additionally, most capital projects will involve numerous variables and possible outcomes. For example, estimating cash flows associated with a project involves working capital requirements, project risk, tax considerations, expected rates of inflation, and disposal values. We have to understand existing markets to forecast project revenues, assess competitive impacts of the project,

and determine the life cycle of the project. If our capital project involves production, we have to understand operating costs, additional overheads, capacity utilization, and startup costs. Consequently, we cannot manage capital projects by simply looking at the numbers; i.e. discounted cash flows. We must look at the entire decision and assess all relevant variables and outcomes within an analytical hierarchy.

In financial management, we refer to this analytical hierarchy as the Multiple Attribute Decision Model (MADM). Multiple attributes are involved in capital projects and each attribute in the decision needs to be weighed differently. You may use an analytical hierarchy to structure the decision and derive the importance of attributes in relation to one another. You should think of MADM as a decision tree that breaks down a complex decision into component parts. This decision tree approach offers several advantages:

- We systematically consider both financial and non-financial criteria.
- Judgments and assumptions are included within the decision based on expected values.
- We focus more of our attention on those parts of the decision that are important.

We include the opinions and ideas of others into the decision. Group or team decision making is usually much better than one person analyzing the decision.

Therefore, our first real step in capital budgeting is to obtain knowledge about the project and organize this knowledge into a decision tree.

Stage 2: Option pricing

The uncertainty about our project is first reduced by obtaining knowledge and working the decision through a decision tree. The second stage in this process is to consider all options or choices we have or should have for the project. Therefore, before we proceed to discounted cash flows we need to build a set of options into our project for managing unexpected changes.

In financial management, consideration of options within capital budgeting is called contingent claims analysis or option pricing. For example, suppose you have a choice between two boiler units for your factory. Boiler A uses oil and Boiler B can use either oil or natural gas. Based on traditional approaches to capital budgeting, the least costs boiler was selected for purchase, namely Boiler A. However, if we consider option pricing Boiler B may be the best choice because we have a choice or option on what fuel we can use.

Suppose we expect rising oil prices in the next five years. This will result in higher operating costs for Boiler A, but Boiler B can switch to a second fuel to better control operating costs.

Consequently, we want to assess the options of capital projects. Options can take many forms; ability to delay, defer, postpone, alter, change, etc. These options give us more opportunities for creating value within capital projects. We need to think of capital projects as a bundle of options. Three common sources of options are:

1. **Timing Options**: The ability to delay our investment in the project.
2. **Abandonment Options**: The ability to abandon or get out of a project that has gone bad.
3. **Growth Options**: The ability of a project to provide long-term growth despite negative values. For example, a new research program may appear negative, but it might lead to new product innovations and market growth. We need to consider the growth options of projects.

Option pricing is the additional value that we recognize within a project because it has flexibilities over similar projects. These flexibilities help us manage capital projects and therefore, failure to recognize option values can result in an under-valuation of a project.

Stage 3: Discounted Cash Flow

So we have completed the first two stages of capital budgeting analysis: (1) Build and organize knowledge within a decision tree and (2) Recognize and build options within our capital projects. We can now make an investment decision based on Discounted Cash Flows or DCF.

Unlike accounting, financial management is concerned with the values of assets today; i.e. present values. Since capital projects provide benefits into the future and since we want to determine the present value of the project, we will discount the future cash flows of a project to the present.

Discounting refers to taking a future amount and finding its value today. Future values differ from present values because of the time value of money. Financial management recognizes the time value of money because:

1. **Inflation** reduces values over time; i.e. $ 1,000 today will have less value five years from now due to rising prices (inflation).
2. **Uncertainty** in the future; i.e. we think we will receive $ 1,000 five years from now, but a lot can happen over the next five years.

3. **Opportunity Costs** of money; $ 1,000 today is worth more to us than $ 1,000 five years from now because we can invest $ 1,000 today and earn a return.

If we know the prevailing interest's rate (r) in the economy and the future project's cash flows (C) what is the project's value to you today? In other words, we are looking for the present value – the amount the future sum of money is worth today, given a specific rate of return.

Example

You expected to receive $1000 next year. The interest rate is 10%. How much would you have to save? Or if your project will return $1000 next year, what is it worth today?

$$\mathbf{PV = C/(1+r) = 1000/(1+0,1) = \$909,1.}$$

This is how much the project costs today or this is the value today of future cash flows.

Let us extend the time frame. What would $1000 in two periods be worth today?

$$\mathbf{PV = C_1/(1+r) + C_2/(1+r)^2 = \$909,1+\$826,4 = \$1735,5}$$

We now understand discounting of cash flows (DCF) and the three reasons why we discount future cash flows: Inflation, Uncertainty, and Opportunity Costs.

3.2. Calculating the Discounted Cash Flow

In capital budgeting analysis we want to determine the after tax cash flows associated with capital projects. We are concerned with all relevant changes or differences to cash flows once we invest in the project.

One question that we must ask in capital budgeting is what is relevant. Here are some examples of what is relevant to project cash flows:

1. **Depreciation**: Capital assets are subject to depreciation and we need to account for depreciation twice in our calculations of cash flows. We deduct depreciation once to calculate the taxes we pay on project revenues and we add back depreciation to arrive at cash flows because depreciation is a non-cash item.
2. **Working Capital**: Major investments may require increases to working capital. For example, new production facilities often require more inventories and higher salaries payable. Therefore, we need to consider the net change in working capital associated with our project. Changes in net working capital will sometimes reverse themselves at the end of the project.

3. **Overhead**: Many capital projects can result in increases to allocated overheads, such as computer support services. However, the subjective nature of overhead allocations may not make any difference at all. Therefore, you need to assess the impact of your capital project on overhead and determine if these costs are relevant.
4. **Financing Costs**: If we plan on financing a capital project, this will involve additional cash flows to investors. The best way to account for financing costs is to include them within our discount rate. This eliminates the possibility of double-counting the financing costs by deducting them in our cash flows and discounting at our cost of capital which also includes our financing costs.

We also need to ignore costs that are sunk; i.e. costs that will not change if we invest in the project. For example, a new product line may require some preliminary marketing research. This research is done regardless of the project and thus, it is sunk. The concept of sunk costs and relevant costs applies to all types of financing decisions.

So far, we have covered present values and relevancy within capital budgeting. We now can proceed to calculate the present value of relevant cash flows. Once we have determined the present value of cash flows, we will have a basis for comparing our initial investment. Both values (future cash flows and initial investment) will be expressed in current values. The net of these two amounts will tell us how much value we will create or destroy by investing in a project.

Example: Calculate Relevant Cash Flows for Capital Project

A company plans to purchase a new equipment for $ 35,000. It will cost $4,000 to have the new equipment installed and they expect a $ 3,000 net increase in working capital. By making the investment, the company will reduce its annual operating costs by $ 9,000 and expects to save $ 1000 a year in maintenance. The new machine will require $ 950 each year for technical support. The company will depreciate the equipment over 5 years under the straight-line method of depreciation with an expected salvage value of $ 5,000. The effective tax rate is 40%.

Annual Savings in Operating Costs	9,000
Annual Savings in Maintenance	1,000
Annual Costs for Technical Support	(950)
Annual Depreciation	(6,000)
Revenues	3,150

Taxes 40%	(1,260)
Net Project Income	1,890
Add Back Depreciation (noncash item)	6,000
Relevant Project Cash Flow	**7,890**

The company will receive $ 7890 of cash flow each year by investing in this new assembly machine. Since there is a salvage value, the company will have a terminal cash flow associated with this project.

Estimated Salvage Amount in 5 Years	5,000
Less Taxes	(2,000)
Terminal Cash Flow	**3,000**

Our next step is to calculate present values of our two cash flow streams. We will use our cost of capital to discount the cash flows. We will assume that our cost of capital is 12%.

Annual Project Cash Flows	7,890
Discount Factor (1) $\Sigma C/(1+r)^t$	3.605
Present Value of Annual Flows (CF*DF)	$20,866
Discount Factor (2) $C/(1+r)^5$	0.567
Present Value of Terminal Flow	$1,701
Total Present Value	$22567

Now that we have the current value of $ 22,567 for our cash flows, we need to compare this to our investment amount. Our investment is the total cash outlay we must make today and it includes:

- All cash paid out to invest in the project and place it into service, such as installation, transportation, etc.
- Net proceeds from the disposal of any old equipment that will be replaced by the new equipment.
- Any taxes paid and/or tax benefits received from making the investment.

Referring back to the example, we can calculate our Net Investment. We will also assume that existing equipment can be sold for $ 8,000.

Acquisition Costs	$35,000
Installation Costs	$3,000
Increase in Working Capital	$2,000
Proceeds from Sale	$8,000
Less Taxes	($3,200)

Net Proceeds from Sales	($4,800)
Net Investment	**$35,200**

We now have a current value for our cash flows of $ 22,567 and a total net investment of $35,200. These amounts are derived by looking at three different types of cash flows:

1. Relevant cash flows during the life of the project.
2. Terminal cash flows at the end of the project.
3. Initial cash flows (net investment).

3.3. Criteria of Projects Evaluating

We have completed our three main stages of capital budgeting analysis, including the calculation of discounted cash flows. The next step is to apply some economic criteria for evaluating the project. We will use three criteria: Net Present Value, Modified Internal Rate of Return, and Discounted Payback Period.

The first criterion we will use to evaluate capital projects is Net Present Value. Net Present Value (NPV) is the total net present value of the project. It represents the total value added or subtracted from the organization if we invest in this project. We can refer back to our previous example and calculate Net Present Value.

NPV = Net Investment Outflow ($35,200) – Present Value of Inflows ($22,567) = ($12,633)

If the Net Present Value is positive, we should proceed and make the investment. If the Net Present Value is negative, then we would not make the investment. So in our example the company should not invest in the equipment.

Besides determining the Net Present Value of a project, we can calculate the rate of return earned by the project. This is called the Internal Rate of Return. Internal Rate of Return (IRR) is one of the most popular economic criteria for evaluating capital projects since managers can identify with rates of return. Internal Rate of Return is calculating by finding the discount rate whereby the Net Investment amount equals the total present value of all cash inflows; i.e. Net Present Value = 0. If we have equal cash inflows each year, we can solve for IRR easily.

Referring back the example, we would solve for IRR as follows:

$ 7,890 x discount factor = $ 35,200 or $ 35,200 / $ 7,890 = 4.461.

If we look in the Present Value Tables for n = 5 years, we want to find a present value factor nearest to 4.461.

By referring to calculations, we find the following:

At 3%, n=5	4.580	4.580
As calculated	4.461	
At 4%, n=5		4.452
Difference	0.119	0.128

$0.03 + (0.119/0.128)*(0.04-0.03) = 0.0393$

Internal Rate of Return = 3.93%

The final economic criteria we will use is the Discounted Payback Period. Payback refers to the number of years it takes to recover our net investment. In our previous example, we could use a simple payback calculation as follows:

$ 35,200 / $ 7,890 = 4.5 years

However, this method does not recognize the time value of money and as we previously indicated, we must consider the time value of money because of inflation, uncertainty, and opportunity costs. Therefore, we will use the discounted cash flows to calculate the payback period (discounted payback period).

Under the Discounted Payback Period, we would never receive a payback on our project; i.e. the total to date present cash flows never reached $ 35,200 (net investment). If we had relied on the regular payback calculation, we would falsely assume that this project does payback in the fourth year.

Chapter 4. MANAGEMENT OF CAPITAL

The chapter provides an overview of concepts related to management of capital. Managing the capital aims at finding an optimal capital structure that is defined as a mix of a company's long-term debt, short-term debt, common equity and preferred equity. A company must know how to successfully manage a capital structure to have a clear definition of its debt to equity ratio. The financial records of all of the company's transactions must be monitored and maintained in an efficient account management system. Overall, the capital structure is the basis for understanding the impact of the initial investments and expenses of a particular company's business

4.1. The Economics of Capital

The long-term investments we make today will determine the value of our business tomorrow. In order to make long-term investments in new product lines, new equipment and other assets, managers must know the cost of obtaining funds to acquire these assets. The cost associated with different sources of funds is called the cost of capital. Cost of Capital represents the rate a business must pay for each source of funds - debt, preferred stock, common stock, and retained earnings.

Since we want to maintain existing market values, cost of capital is the minimum acceptable rate of return for long-term investments. If the business earns more than its cost of capital, the market value of the business will increase. Likewise, if returns on long-term investments are below the cost of capital, market values will decline. This leads us to a very fundamental objective within financial management - maximizing values for the owners of the business. Therefore, how we manage capital is extremely important to fulfilling the basic objective of increased shareholder value.

An understanding of economics and capital can also help us understand how we should manage capital within an organization. For example, the total amount of capital available is determined by the total amount of investment. The overall economy has a total capital equal to the sum of all capital goods (assets). Since these goods lose value over time, some level of reinvestment is needed to maintain the asset base at its current size. Additional investments will cause the capital stock of an economy to grow, similar to the assets of a business.

The amount invested in the economy is determined by the after tax rate of return on capital. The actual level of investment depends on the willingness of people to invest in assets. People invest based on the returns they expect to

receive. The returns to investors must be adjusted for inflation, taxes, depreciation, and risk related to the investment. It is the after tax real rate of return that drives investment.

Overall, the after tax rate will remain constant over time due to changes in investment spending. For example, if the rate of return on capital were to increase, there will be an increase in investment spending. As the capital stock expands from increased investing, the rate of return on capital will drop back down. Conversely, when the rate of return on capital is low, there will be a decrease in investment. As capital shrinks, the rate of return on capital rises. Consequently, investment spending will keep rates of return on capital at stable levels.

Taxation of capital will increase the cost of capital. In order to supply capital, investors must receive a minimum after tax real rate of return. The users of capital not only pay investors a nominal rate of return, but they also incur the cost of economic depreciation (lost values of capital assets) and related taxes on capital. These total costs represent the cost of capital.

4.2. Managing the capital

Now that we understand the importance of capital, let us focus on how we manage capital within an organization. The overall objective is to find an "optimal" capital structure - the right mix of capital sources (debt and equity) that minimizes the overall cost of capital and maximizes values to the shareholders (owners of the business). When we raise capital, we have two choices - issue debt or issue stock. Debt is represented by bonds which are long term instruments sold to investors. Stock is the ownership interest of the business and depending upon the rules of incorporation, stockholders will have certain rights. Therefore, we start our understanding of capital management by looking at the advantages and disadvantages of the two sources of capital:

Some advantages to using stock are:

- No fixed payments are required to investors; dividends are paid only as earnings are available.
- No maturity date on the security, the invested capital does not have to be repaid.
- Improves the credit worthiness of the company.

Some disadvantages to using stock are:

- Dilutes the earnings per share to shareholders.
- Issuance costs are higher than debt.

- Issuing more stock can increase the overall cost of capital.
- Dividend payments to shareholders are not tax deductible.

Some advantages to using debt are:

- Interest payments are tax deductible.
- Does not dilute earnings per share or control within the company.
- Cost is fixed; interest and principal do not change.
- Expected returns to investors are usually lower than stock.

Some disadvantages to using debt are:

- Fixed charges must be paid regardless of available earnings or cash flow.
- Adds more risk to the business.
- Has a maturity date and the capital invested must be repaid to investors.

In addition to understanding the pros and cons of financial securities, we also need to recognize that several conditions will impact how we raise capital.

These conditions include:

Economic Conditions: The demand and supply of capital in the marketplace can impact how capital is raised. For example, expectations of inflation will influence the cost that is paid for capital. Higher rates of inflation erode the values of investments and thus, investors will demand higher rates of return.

Market Conditions: The demand for higher rates of return will increase the cost of capital. For example, if we raise capital with a security that is not highly marketable, investors will require higher rates of return for the increased risk.

Operating Conditions: The level of fixed costs used to operate the business needs to be considered. For example, higher fixed costs can result in wider variations to operating income from numerous factors - increased competition, slower economic growth, etc. This is referred to as business risk.

Financial Conditions: The existing levels of outstanding debt will impact how capital will be raised. Higher levels of debt (including preferred stock) can result in wider variations to earnings due to higher fixed obligations that must be paid (interest to debt holders and fixed dividends to preferred stock holders). This is referred to as financial risk.

Not only do we need to look at various conditions, but we need to consider how financing will impact capital structure. Capital structure appears on the right side of the Balance Sheet as liabilities and equity; i.e. the long-term sources of funds to finance assets. Assets appear on the left side of the Balance Sheet. Capital structure is the permanent financing of the business through the

use debt and stock. The total of all liabilities and equity is referred to as Financial Structure.

Therefore, Capital Structure = Financial Structure - Current Liabilities.

Finding the right capital structure encompasses numerous considerations - growth rates in sales, risk attitudes of management, liquidity of assets, control position of the company, etc.

Finding the right capital structure also involves finding the right amount of financial leverage. Financial leverage is the financing of assets with fixed obligations - debt and preferred stock.

The use of financial leverage increases return on equity up to a certain level of operating income. As you use more financial leverage (debt and preferred stock), higher levels of operating income are needed to cover the additional fixed obligations (interest on debt and fixed dividends on preferred stock).

Generally, the use of financial leverage will improve financial performance whenever returns are higher than the costs of obtaining funds. In a perfect world, management would favor more leverage whenever return on capital exceeds the after tax costs of debt. However, higher returns also result in higher risk to the business (risk return tradeoff). Therefore, the use of financial leverage is a balancing act between higher returns for shareholders vs. higher risk to shareholders.

Financial leverage can be measured with ratios such as debt to total assets. Financial leverage is also expressed as the Degree of Financial Leverage or DFL. DFL is the percentage change in earnings given a change in operating income (Earnings Before Interest & Taxes or EBIT). The higher the DFL, the riskier the business.

We can use the following formula to calculate DFL:

DFL = EBIT / EBIT - I - (P / (1-TR))

where I is Interest and P is Preferred Dividends and TR is the tax rate.

Example 1. Calculate Degree of Financial Leverage (DFL)

Meabon Corporation has sales of $ 500,000 with total operating costs consisting of $ 430,000 in variable costs and $ 40,000 in fixed costs. Annual interest is $ 7,000 and preferred dividends are $ 3,000 per year. The tax rate is 20%.

1. EBIT = Sales – Variable Costs – Fixed Costs = 500,000 – 430,000 – 40,000 = 30,000
2. DFL = 30,000 / 30,000 -7,000 – (3,000/1-0,2) = 1.56

In addition to financial leverage, there is operating leverage. Operating leverage is the use of fixed costs in production over variable costs. For example, replacing production workers (variable cost) with robots (fixed cost) would be an example of increased operating leverage.

As operating leverage increases, more sales are needed to cover the increased fixed costs. Since variable costs have been reduced, profits will increase more given an increase in sales after the breakeven point has been reached. High levels of fixed costs increase business risk.

Like financial leverage, we can measure the Degree of Operating Leverage (DOL) as the percentage change in operating income given a change in sales. The following formula can be used to calculate DOL:

DOL = CM / CM - FC

where CM is Contribution Margin and FC is Fixed Cost.

Example 2. Calculate Degree of Operating Leverage (DOL)

Referring back to Example 1, we can make the following calculations:
Sales $ 500,000
Less Variable Costs (430,000)
Contribution Margin $ 70,000
DOL = $ 70,000 / $ 70,000 - $ 40,000 = 2.33

Usually firms use one form of leverage over the other to finance investments. For example, manufacturing companies tend to invest heavily in fixed assets and thus operating leverage is used much more than financial leverage. Service type companies have low levels of investment in fixed assets and therefore, financial leverage is widely used to finance the business. Leverage is relative to the type of fixed cost approach that is appropriate for funding the business and leverage by its very definition creates risk. Therefore, the use of leverage will always include a tradeoff between risk and return.

4.3. Approaches to Managing the Capital

One way to understand how to manage capital is to look at the various approaches that can be used for finding the right capital structure. As we previously indicated, the right capital structure is that mix of debt and stock that maximizes the value of the firm while at the same time maintains a relatively low overall cost of capital. Two very different approaches to capital management are the Net Operating Income Approach and the Net Income Approach.

Net Operating Income Approach: This approach to capital management concludes that it does not matter how you mix the capital structure. The value of the business is not determined by how you arrange the right side of the Balance Sheet. Additionally, the overall cost of capital will not change as you change the mix of capital. Therefore, values are determined by the capitalization of operating income or EBIT (Earnings Before Interest Taxes).

Example 3. Calculate Market Value of Business under Net Operating Income Approach to Capital Management

Orton Company has $ 600,000 in outstanding debt at 8% interest. Orton's cost of capital is 14% and expected operating income or Earnings Before Interest & Taxes (EBIT) is $ 180,000.

Earnings to Shareholders = $ 180,000 - $ 48,000 (8% interest on debt) = $132,000.

Total Market Value = $ 180,000 / .14 = $ 1,285,715

Market Value of Stock = $ $ 1,285,715 - $ 600,000 = $ 685,715

Cost of Equity = $ 132,000 / $ 685,715= 19.25%

Net Income Approach: In contrast to the Net Operating Income Approach, the Net Income Approach concludes that the capital structure of an organization has a major influence on the value of the organization. Therefore, the use of leverage will change both the cost of capital and the value of the firm. Net Income is capitalized in arriving at the market value of the firm.

Example 4. Calculate Market Value of Business under Net Income Approach to Capital Management

Referring back to Example 3, we can calculate the following values:

Market Value of Stock = $ 132,000 / 19.25% = $ 685,715

Total Value = $ 685,715+ $ 600,000 = $ 1,285,715

Overall Cost of Capital = $ 180,000 / $ 1,285,715= 14%

Franco Modigliani and Merton Miller have provided some guidance between the Net Operating Income Approach and the Net Income Approach. Modigliani and Miller concluded that capital structure is not a major factor in the determination of values. Values are determined by the investment and operating decisions that generate cash flows. It is cash flows that give rise to values. This approach to valuation has become a mainstay within financial management. But what about capital structures?

Mike Jenson, founder of the Journal of Financial Economics, may have

resolved the answer to this question. Jenson noted that whenever a company makes a change in its capital structure, it sends a signal to investors. This signaling effect does in fact result in changes to valuations. For example, when the Chairman of the Federal Reserve speaks about interest rates, a signal is sent to the marketplace and valuations quickly change. Therefore, shifts in capital structure do impact the value of a business. Jenson also noticed that managers have a tendency to guard capital and minimize the distribution of dividends to shareholders. This follows with the so-called "pecking order" of financing whereby managers prefer internal sources of capital to external sources of capital.

The specific pecking order is as follows:

1. Internal sources of capital - retained earnings / cash
2. External sources of capital - debt
3. External sources of capital - convertible securities
4. External sources of capital - preferred stock
5. External sources of capital - common stock

Consequently, capital structures can impact valuations due to the so-called signaling effect. Additionally, the real source of values will reside in cash flows (more specifically free cash flows). Free cash flows are the excess cash that can be withdrawn from a business after paying everything off. And in order to generate free cash flows, management must generate returns in excess of the cost of capital.

4.4. Calculating the Cost of Capital

In order to evaluate projects of average risk, we must know the overall cost of capital. Cost of Capital is calculated as the weighted average of each component of capital - debt, common stock, preferred stock, and retained earnings. Each component is calculated as follows:

Cost of Debt (Cd): Calculate the after tax cost of debt based on the effective interest rate. The following formula is used to calculate the cost of debt: ***Cd = I (1 - TR)*** where I is Interest Rate on Debt and TR is the Tax Rate.

Example 5. Calculate the Cost of Debt

Sentor Corporation borrowed $ 100,000 at 8% interest. The amount of the loan proceeds was $ 96,000 and the tax rate is 20%.

Cost of Debt = ($ 100,000 x .08) / $ 96,000 x (1 - .20) = 8.3% x .80 = 6.64%

Cost of Common Stock (Ccs): Three different methods can be used to calculate the Cost of Common Stock. The three methods are:

1. **Dividend Growth** - Dividends paid to common shareholders along with the overall expected growth rate is used to calculate a cost for the common stock. The formula for calculating the cost of common stock is: (Dividends in Year 1 / Market Value of Stock) +Overall Growth Rate.

Example 6. Calculate the Cost of Common Stock based on Dividend Growth
Sentor Corporation expects to pay a $ 7.00 dividend this year to common shareholders. Historically, dividends have grown by 2% each year. Sentor's common stock is currently selling for $ 35.00 per share.
Cost of Common Stock = ($ 7.00 / $ 35.00) + .02 = 20.2%.

2. **Capital Asset Pricing Model (CAPM)** - The CAPM is the most widely used approach to calculating the cost of common stock. The CAPM uses three components to calculate the cost of common stock - (1) **rf** is the risk free rate earned by investors (such as U.S. Treasury Bonds; (2) **b** is the beta coefficient which expresses the risk of the common stock in relation to the market; and (3) **rm** is the rate earned in the market (such as the Standard & Poor's 500 Composite Index).
   The CAPM formula is Ccs = **rf** + **b** (**rm**- **rf**).

Example 7. Calculate the Cost of Common Stock based on CAPM
Sentor Corporation has common stock with a listed beta of 1.4. The estimated market return is 14% and the risk free rate based on Treasury Bonds is 6.0%.
Ccs = 6.0% + 1.4 (14% - 6.0%) = 17.2%

3. **Bond Plus -** A simple approach to calculating the cost of common stock is to add a risk premium to the cost of debt. The formula is Ccs = Cd + risk premium. The risk premium is the additional rate that must be paid to common shareholders above what is paid to bond holders.

Example 8. Calculate the Cost of Common Stock based on Bond Plus
Referring back to Example 5, we calculated a cost of debt of 6.64%. We have estimated a market risk premium on common stock of 4%.
Ccs = 6.64% + 4.0% = 10.64%

Cost of Preferred Stock (Cps) - If your capital structure includes preferred stock, the cost of preferred stock is calculated by the amount of dividends in relation to the market price of the preferred stock. The formula is Cps =

Dividends / Market Price of Stock.

Example 9. Calculate the Cost of Preferred Stock

Assume we have preferred stock selling for $ 80 per share and dividends per share are $ 10. The cost of preferred stock is:

Cps = $ 10 / $ 80 = 12.5%

Cost of Retained Earnings - The cost of retained earnings (internal funds) within a capital structure is similar to the cost of common stock. We can think of the cost of retained earnings in relation to the opportunity cost of how we can use these funds. Generally, the cost of retained earnings is slightly less than the cost of common stock since no issuance costs is incurred.

After we have calculated each component cost of capital, we will calculate a weighted average based on the relative market values of each component. The following example will illustrate how weighted average cost of capital is calculated.

Example 10. Calculate Weighted Average Cost of Capital

Sentor Corporation has the following capital structure:

Capital Component	Book Value	Cost of Capital
Long Term Debt (5,000 bonds)	$ 5,000,000	5.4%
Common Stock (62,500 shares)	$ 2,500,000	13.9%
Preferred Stock (20,000 shares)	$ 500,000	12.5%
Retained Earnings	$ 750,000	12.0%

Market prices are $ 1,050 for bonds, $ 65.00 for common stock, and $35.00 for preferred stock. Total market values are calculated as follows:

Long Term Debt = 5,000 x $ 1,050 $ = 5,250,000

Common Stock = 62,500 x $ 65.00 $ = 4,062,500

Preferred Stock = 20,000 x $ 35.00 $ = 700,000

Since retained earnings have a market value closely tied to common stock, we will allocate the common stock market value between common stock and retained earnings based on book values.

Common Stock = $ 4,062,500 x ($2,500,000 / $3,250,000) = $ 3,125,000

Retained Earnings = $ 4,062,500 x ($750,000 / $3,250,000) = $ 937,500

Weighted Average Cost of Capital is calculated as follows:

Capital Component	Market Values	Mkt% x	C of Cp	Wgh C of Cp
Long Term Debt	$ 5,250,000	52%	5.4%	2.8%
Common Stock	$ 3,125,000	31%	13.9%	4.3%
Preferred Stock	$ 700,000	7%	12.5%	0.9%
Retained Earnings	$ 937,500	10%	12.0%	1.2%

Weighted Average Cost of Capital = 9.2%

Our overall cost of capital is calculated as a weighted average based on the relative market values of each component of capital. If market values are not available, use %'s derived from the targeted or forecasted capital structure. If worse comes to worse, you can fall back on book values. In any event, the weighted average cost of capital is the overall cost of capital that will be used to evaluate capital investments.

Cost of Equity and Risk

The Cost of Equity is the rate of return required by those who invest in equity securities. The expected return can be broken down into two components - Risk Free Rate and Risk Premium. A good benchmark for establishing the Risk Free Rate is the rate paid on 30 year U.S. Treasury Bonds since the risk of default is virtually non-existent. The Risk Premium can be established by understanding two forms of risk - Business Risk and Financial Risk. In the absence of debt, shareholders are confronted with one form of risk, business risk. Business Risk is the risk of changes to operating income from numerous factors that influence business. When we introduce debt, we have to include financial risk. Financial Risk is the risk of changes to earnings from the use of increased debt. More debt results in higher interest payments, which impacts earnings. Consequently, the Risk Premium consists of Business Risk + Financial Risk.

Since the cost of capital represents the rate that must be paid to investors for the use of long-term funds, higher risk to investors will increase the cost of capital.

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