FINANCIAL MANAGEMENT

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Preface

The main objective of the organizational is to stay on the path of profit and growth, and to embody this it is necessary to find an organizational pattern that ensures the harmonious distribution of roles and functions within the enterprise in an integrated manner.

Then the textbook focuses in the second chapter on the financial analysis of the financial statements of companies by discussing the concept of financial analysis, the importance of financial analysis, the beneficiaries of financial analysis, the steps of financial analysis, and methods of financial analysis.

As for the next topic, it will be addressed in the second chapter, which is financial planning and forecasting by studying the preparation of the expected financial statements, which are the expected income statement, the estimated cash budget, the preparation of the expected financial position statement, and the method of financial forecasting using the percentage of sales.

Profit planning is one of the basic functions of the financial manager in the enterprise. The third chapter will focus on the issues related to profitability planning, which include break-even analysis, operating and financing leverage, and the combination of operating and financing leverage.

One of the most important decisions taken by the financial manager is related to the sources of funding needed for these

projects. In the fourth chapter, the focus will be on discussing a number of issues related to finance calculating the cost of the elements of the long-term financing structure (Capital) and the weighted cost of capital.

Finally, the fifth chapter focuses on the various aspects of the subject of evaluating investment decisions, as it deals with the concept of investment and financial markets, the importance and objectives of investment, and the nature of the relationship between the return on investment and the degree of risk. The scientific foundations and principles in making investment decisions and methods of differentiation between investment projects.

I hope that the topics of this book will meet the students' interest, and we have considered the ease of presentation and giving many solved examples and unsolved exercises so that the student can train on the topics and issues being studied.

Best wishes

Dr. Alaa Tag Eldin Mohamed

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Financial Management

Chapter One: Basic Concepts of Financial Management and Financial Analysis

OBJECTIVES

This chapter is included to equip the learners on the basics of financial management. The learners need to define financial management, identify the objectives of financial management and understand the responsibilities of financial managers. It discusses the financial analysis ratios and gives examples of how to analyze the financial health of business corporations.

Financial Management Defined

Financial Management can be defined as: The management of the finances of a business/ organization to achieve financial objectives. Financial Management involves sourcing of funds, making appropriate investments and identify the best mix of finance and dividends in relation to the value of the firm.

Taking a commercial business as the most common organizational structure, the key objectives of financial management would be to:

- Create wealth for the business
- Generate cash, and
- Provide an adequate return on investment bearing in mind the risks that the business is taking, and the resources invested.

Financial management is important in all types of businesses as well as government operations like hospitals and school.

Areas of Financial Management

There are three key elements to the process of financial management:

(1) Financial Planning:

Management needs to ensure that enough funding is available at the right time to meet the needs of the business. In the short term, funding may be needed to invest in equipment and stocks, pay employees and fund sales made on credit.

In the medium and long term, funding may be required for significant additions to the productive capacity of the business or to make acquisitions.

(2) Financial Control:

Financial control is a critically important activity to help the business ensure that the business is meeting its objectives. Financial control addresses questions such as:

- Are assets being used efficiently?
- Are the businesses assets secure?
- Do management act in the best interest of shareholders and in accordance with business rules?

(3) Financial Decision-making:

The key aspects of financial decision-making relate to investment, financing, and dividends:

- Investments must be financed in some way – however there are always financing alternatives that can be considered.
- A key financing decision is whether profits earned by the business should be retained rather than distributed to shareholders via dividends. If dividends are too high, the business may be starved of funding to reinvest in growing revenues and profits further.

The responsibility of financial staff

- **Forecasting and planning**

Finance staff should be able to coordinate activities of various departments within the business and be able to forecast both the short- and long-term requirements of these departments.

- **Appraising investment activities**

Business needs to expand but unplanned expansion program

leads to over capitalization. Finance managers have the responsibility to assess the viability of any capital investment undertaken by an enterprise. Only those projects which will add value to the business should be undertaken.

- **Coordination and control**

To satisfy the needs of various stakeholders, finance management staff should ensure efficient utilization of resources. Without coordination there will be competition within the business on scarce resources.

Example, if the purchasing department purchase from a cheaper source, it will improve its budgetary position, but the quality may not be that good and will result in poor performance for the manufacturing department.

- **Decision on finance market**

The Financial managers are required to source funds for the enterprise as they are supposed to have a wider knowledge on financial market. The finance staffs will advise the firm on both short- and long-term sources of finance. They are supposed to consider both cost and the financial position of the business before embarking on any financial market.

- **Risk management**

Finance staff needs to assess all the risk which the business faces and make prearranged efforts to minimize or if possible, eliminate this risk such as political risks.

- **Performance measurement**

Financial managers should appraise the performance of the enterprise as a whole and its departments. The manager should compare the targets set for the enterprise and the actual performance achieved.

Financial Analysis

OBJECTIVES

Financial ratio analysis is an important topic to study because it can teach us so much about accounts and businesses. When we use ratio analysis, we can work out how profitable a business is, we can tell if it has enough money to pay its bills and we can even tell whether its shareholders should be happy.

Ratio analysis can also help us to check whether a business is doing better this year than it was last year; and it can tell us if our business is doing better or worse than other businesses doing and selling the same things.

What is financial ratio?

In assessing the significance of various financial data,

managers often use ratio analysis, the process of determining and evaluating financial ratios.

A **financial ratio** indicates a relationship between a company's activities.

For example, the ratio between the company's current assets and current liabilities or between its accounts receivable and its annual sales.

Importance of Financial Ratio Analysis

Financial ratio analysis is a process whereby the analyst or manager determines the degree of financial health represented by the firm's financial statements.

- First, it can aid in interpreting and evaluating income statements and balance sheets by reducing the amount of data contained in them to a workable amount.
- Second, financial ratio analysis can make financial data more meaningful.
- Third, ratios help to determine relative magnitudes of financial quantities. Financial ratios are useful indicators of a firm's performance and financial situation.

Ratios are only meaningful when compared with other information. Since they are often compared with industry data, ratios help managers understand their company's performance

relative to that of competitors and are often used to trace performance over time.

Types of Ratios[1]

Financial ratios can be classified according to the information they provide. The following types of ratios frequently are used:[2][3][4]

- Liquidity ratios
- Asset turnover ratios
- Financial leverage ratios
- Profitability ratios
- Dividend policy ratios

Liquidity Ratios

Liquidity ratios provide information about a firm's ability to meet its short-term financial obligations when and as they fall due. Failure to do this will result in the total failure of the business, as it would be forced into liquidation. They are of particular interest to those extending short-term credit to the firm. Liquidity ratios measure the relationship between current liabilities and current assets.

Three frequently-used liquidity ratios are the current ratio (or working capital ratio), the quick ratio (or acid ratio) and the cash ratio.

The current ratio is the ratio of current assets to current liabilities:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The current ratio is a general indicator of the business's ability to meet its short-term financial commitments. This ratio assumes that all current assets, if required, can be converted to cash immediately to meet all current liabilities immediately.

Many texts recommend that the current ratio should be at least 2:1, that is current assets should be at least twice the value of current liabilities. Presumably, this is to allow a safety margin, as current assets do not usually achieve their full value if they have to be converted to cash in a hurry.

Short-term creditors prefer a high current ratio since it reduces their risk. Shareholders may prefer a lower current ratio so that more of the firm's assets are working to grow the business.

One drawback of the current ratio is that inventory may include many items that are difficult to liquidate quickly and that have uncertain liquidation values.

The quick ratio is an alternative measure of liquidity. It is the current ratio modified to provide a more prudent measure of liquidity. It deducts inventory from current assets. This approach is

more careful as it recognizes that inventory is not always readily converted into cash at full value. The quick ratio is defined as follow:

$$\text{Quick Ratio} = \frac{\text{Current Assets - Inventory}}{\text{Current Liabilities}}$$

The current assets used in the quick ratio are cash, accounts receivable, and notes receivable. These assets essentially are current assets less inventory. The quick ratio often is referred to as the acid test.

Finally, the **cash ratio** is the most conservative liquidity ratio. It excludes all current assets except the most liquid: cash and cash equivalents. The cash ratio is an indication of the firm's ability to pay off its current liabilities if for some reason immediate payment were demanded. The cash ratio is defined as follows:

$$\text{Cash Ratio} = \frac{\text{Cash} + \text{Marketable Securities}}{\text{Current Liabilities}}$$

Example Company Balance Sheet December 31, 2023			
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 Liabilities & Stockholders' Equity**	$770,000

Example Corporation Income Statement For the year ended December 31, 2023	
Sales (all on credit)	$500,000
Cost of Goods Sold	380,000
Gross Profit	120,000
Operating Expenses	
Selling Expenses	35,000
Administrative Expenses	45,000
Total Operating Expenses	80,000
Operating Income	40,000
Interest Expense	12,000
Income before Taxes	28,000
Tax Expense	5,000
Net Income after Taxes	$ 23,000

Now we calculate current ratios:

Current Ratio	= = =	Current Assets ÷ Current Liabilities $89,000 ÷ $61,000 **1.46**	This tells you the relationship of current assets to current liabilities. A ratio of 3:1 is better than 2:1. A 1:1 ratio means there is no working capital.
Quick Ratio (Acid Test Ratio)	= = = =	[(Cash + petty cash + Temp. Investments + Accounts Receivable) ÷ Current Liabilities] : 1 [($2,100 + $100 + $10,000 + $40,500) ÷ $61,000] : 1 [$52,700 ÷ $61,000] : 1 **0.86 : 1**	This ratio is similar to the current ratio except that Inventory, Supplies, and Prepaid Expenses are excluded. This indicates the relationship between the amount of assets that can quickly be turned into cash versus the amount of current liabilities.
Cash Ratio	= = =	[(Cash + Petty Cash) ÷ Current Liabilities] : 1 [($2,100 + $100) ÷ $61,000 **0.036 :1**	

Asset Utilization Ratios

Asset utilization ratios indicate of how efficiently the firm utilizes its assets. They sometimes are referred to as efficiency ratios, asset turnover ratios, or asset management ratios. If a business does not use its assets effectively, investors in the business would rather take their money and place it somewhere else. For the assets to be used effectively, the business needs a high turnover.

Note: Increased turnover can be just as dangerous as reduced turnover if the business does not have the working capital to support the turnover increase. As turnover increases more working capital and cash is required and if not, overtrading occurs.

Two commonly used asset turnover ratios are receivables turnover and inventory turnover.

Receivables turnover

Receivables turnover is an indication of how quickly the firm collects its accounts receivables and is defined as follows:

$$\text{Receivables Turnover} = \frac{\text{Annual Credit Sales}}{\text{Accounts Receivable}}$$

The receivables turnover often is reported in terms of the number of days that credit sales remain in accounts receivable

before they are collected. This number is known as the collection period.

Average Collection Period:

The average collection period measures the quality of debtors since it indicates the speed of their collection. The shorter the average collection period, the better the quality of debtors, as a short collection period implies the prompt payment by debtors. An excessively long collection period implies a very liberal and inefficient credit and collection performance.

The delay in collection of cash impairs the firm's liquidity. On the other hand, too low a collect ion period is not necessarily favorable, rather it may indicate a very restrictive credit and collection policy which may curtail sales and hence adversely affect profit.

$$\text{Average Collection Period} = \frac{\text{(Average) accounts Receivable}}{\text{Annual Credit Sales / 365}}$$

The collection period also can be written as:

$$\text{Average Collection Period} = \frac{365}{\text{Accounts Receivable Turnover}}$$

Inventory turnover is another major asset turnover ratio. It indicates the efficiency of the firm in selling its product. It is calculated by dividing the cost of goods sold by the average inventory.

It is the cost of goods sold in a period of time divided by the average inventory level during that period:

$$\text{Inventory Turnover} = \frac{\text{Sales}}{\text{Average Inventory}}$$

Note: If the cost of goods sold figures are reported, they are more preferably used than the sales figures.

The inventory turnover often is reported as the *inventory period*, which is the number of days' worth of inventory on hand, calculated by dividing the inventory by the average daily cost of goods sold:

$$\text{Inventory Period} = \frac{\text{Average Inventory}}{\text{Sales or Annual Cost of Goods Sold / 365}}$$

The inventory period also can be written as:

$$\text{Inventory Period} = \frac{365}{\text{Inventory Turnover}}$$

Other Assets Turnover

Other assets turnover ratios include fixed assets turnover, total assets turnover and net assets turnover.

Fixed assets

The fixed assets turnover ratio measures the efficiency with which the firm has been using its fixed assets to generate sales. It is calculated by dividing the firm's sales by its net fixed assets as follows:

$$\text{Fixed assets turnover} = \frac{\text{Sales}}{\text{Net Fixed assets}}$$

Generally, high fixed assets turnovers are preferred since they indicate a better efficiency in fixed assets utilization.

Total assets

Total Asset Turnover is the relationship between sales and total assets.

- The firm should manage its assets efficiently to maximize sales.
- The total asset turnover indicates the efficiency with which the firm uses all its assets to generate sales.

Total assets turnover	= Sales / Total assets

Generally, the higher the firm's total asset turnover, the more efficiently its assets have been utilized.

Net assets

The net asset turnover ratio measures the ability of management to utilize the net assets of the business to generate sales revenue. Too high a ratio may suggest over-trading, that is too much sales revenue with too little investment. Too low a ratio may suggest under-trading and the inefficient management of resources.

$$\text{Net assets turnover} = \frac{\text{Sales}}{\text{Capital Employed}}$$

To illustrate these financial ratios, we will use the previous example balance sheet and income statement information.

Financial Ratio		How to Calculate It	What It Tells You
Accounts Receivable Turnover	= = =	Net Credit Sales for the Year ÷ *Average* Accounts Receivable for the Year $500,000 ÷ $42,000 (a computed average) **11.90**	The number of times per year that the accounts receivables turn over. Keep in mind that the result is an *average*, since credit sales and accounts receivable are likely to fluctuate

			during the year. It is important to use the *average* balance of accounts receivable during the year.
Average Collection Period	= = =	365 days in Year ÷ Accounts Receivable Turnover in Year 365 days ÷ 11.90 **30.67 days**	The *average* number of days that it took to collect the *average* amount of accounts receivable during the year. This statistic is only as good as the Accounts Receivable Turnover figure.
Inventory Turnover	= = =	Cost of Goods Sold for the Year ÷ *Average* Inventory for the Year $380,000 ÷ $30,000 (a computed average) **12.67**	The number of times per year that Inventory turns over. Keep in mind that the result is an *average*, since sales and inventory levels are likely to fluctuate during the year. Since inventory is at cost (not sales value), it is

			important to use the Cost of Goods Sold. Also be sure to use the average balance of inventory during the year.
Inventory Period	= = =	365 days in Year ÷ Inventory Turnover in Year 365 days ÷ 12.67 **28.81**	The *average* number of days that it took to sell the *average* inventory during the year. This statistic is only as good as the Inventory Turnover figure.
Fixed assets turnover	= = =	Sales / fixed assets $500,000/337,000 **1.484**	
Total asset turnover	= = =	Sales / total assets $500,000/$770,000 **6.49**	
Net asset turnover	= = = =	Sales / Capital employed $500,000/[337,000 + (89,000 – 61,000] 500,000/365,000 **1.37**	

Financial Leverage Ratios

Financial leverage ratios provide an indication of the long-term solvency of the firm. Unlike liquidity ratios that are concerned with short-term assets and liabilities, financial leverage ratios measure the extent to which the firm is using long term debt.

The debt ratio

The debt ratio is defined as total debt divided by total assets:

$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

Things to remember

- This ratio is very similar to the debt-equity ratio.
- Each industry has its own benchmarks for debt, but 0.5 is reasonable ratio.
- A ratio under 0.5 means most assets are financed through equity, above 0.5 means they are financed more by debt.
- You can interpret a high ratio as a "highly debt leveraged firm".
- A lower ratio is more favorable than a higher ratio because it implies a more stable business with the potential of longevity because a company with lower ratio also has lower overall debt.

Example:

A company is thinking about building an addition onto the back of its existing building for more storage. The company consults with its banker about applying for a new loan. The bank asks for the shop balance to examine his overall debt levels.

- The banker discovers that the company has total assets of $100,000 and total liabilities of $25,000. The debt ratio would be calculated like this:

$$\text{Debt Ratio} = \frac{\$25,000}{\$100,000} = 0.25$$

Debt Ratio Analysis:

- As you can see, the company only has a debt ratio of 0.25. In other words, it has 4 times as many assets as it has liabilities. This is a relatively low ratio and implies that the company will be able to pay back his loan. The company shouldn't have a problem getting approved for his loan.

The debt-to-equity:

Ratio is total debt divided by total equity:

$$\textbf{Debt-to-Equity Ratio} = \frac{\textbf{Total Debt}}{\textbf{Total Equity}}$$

Things to remember

- A ratio greater than one means assets are mainly financed with debt, less than one means equity provides most of the financing.
- If the ratio is high (financed more with debt) then the company is in a risky position - especially if interest rates are on the rise.

Example

Assume a company has $100,000 of bank lines of credit and a $500,000 mortgage on its property. The shareholders of the company have invested $1.2 million. Here is how you calculate the debt-to-equity ratio.

$$\text{Debt-to-Equity Ratio} = \frac{\$100{,}000 + \$500{,}000}{\$1{,}200{,}000}$$

$$= 0.5$$

Analysis:

Each industry has different debt to equity ratio benchmarks, as some industries tend to use more debt financing than others. A debt ratio of 0.5 means that there are half as many liabilities than there is equity. In other words, the assets of the company are funded 2-to-1 by investors to creditors. This means that investors own 66.6 cents of every dollar of company assets while creditors only own 33.3 cents on the dollar.

The times interest (Interest Coverage):

This ratio indicates how well the firm's earnings can cover the interest payments on its debt. In some respects, the times interest ratio is considered a solvency ratio because it measures a firm's ability to make interest and debt service payments. Since these interest payments are usually made on a long-term basis, they are often treated as an ongoing, fixed expense. As with most fixed expenses, if the company cannot make the payments, it could go bankrupt and cease to exist. Thus, this ratio could be considered a solvency ratio. This ratio also is known as the interest coverage and is calculated as follows:

$$\text{nterest Coverage} = \frac{\text{EBIT}}{\text{Interest Charges}}$$

Where EBIT = Earnings before Interest and Taxes.

Things to remember

- A ratio under 1 means that the company is having problems generating enough cash flow to pay its interest expenses.
- Ideally you want the ratio to be over 1.5.

Example

Tim's company is a construction company that is currently applying for a new loan to buy equipment. The bank asks Tim for his financial statements before they will consider his loan. Tim's income statement shows that he made $500,000 of income before interest expense and income taxes. Tim's overall interest expense for the year was only $50,000.

Tim's time interest earned ratio would be calculated like this:

$$\text{Interest Coverage} = \frac{\$500{,}000}{\$5000}$$

$$= 10 \text{ times}$$

As you can see, the equation uses EBIT instead of net income. Earnings before interest and taxes is essentially net income with the interest and tax expenses added back in. The reason we use EBIT instead of net income in the calculation is because we want a true

representation of how much the company can afford to pay in interest.

You might also want to note that this formula can be used to measure any interest period. For example, monthly or partial year numbers can be calculated by dividing the EBIT and interest expense by the number of months you want to compute.

Analysis:

Going back to our example above, Tim's ratio is 10. It is making enough money from current operations to pay current interest rates 10 times over. The company is extremely liquid and shouldn't have problem getting a loan to expand

Profitability Ratios

Profitability ratios offer several different measures of the success of the firm at generating profits.

Gross profit margin

The Gross profit margin is a measure of the gross profit earned on sales. The gross profit margin considers the firm's cost of goods sold, but does not include other costs.

$$\text{Gross Profit Margin} = \frac{\text{Sales} - \text{Cost of Goods Sold}}{\text{Net Sales}} * 100$$

Gross Profit Margin Analysis:

The gross profit margin ratio tells us the profit a business makes on its cost of sales, or cost of goods sold. It is a very simple idea and it tells us how much gross profit per $1 of sales our business is earning.

The gross profit percentage formula is calculated as:

Gross Profit Percentage

$$\text{Gross Profit Percentage} = \frac{\text{Total Sales} - \text{Cost of Goods Sold}}{\text{Total Sales}}$$

Example: Mona owns a clothing business that designs and manufactures high-end clothing for children. She has several different lines of clothing and has proven to be one of the most successful brands in her space. Here's what appears on Mona's income statement at the end of the year.

- Total sales: $1,000,000
- COGS: $350,000

- Rent: $100,000
- Utilities: $10,000
- Office expenses: $2,500

Mona has an upcoming meeting with investors and wants to know how to find gross profit and what method to use.

First, we can calculate Mona's overall dollar amount of GP by subtracting the $350,000 of COGS from the $1,000,000 of total sales so that the GP is $650,000.

As you can see, Mona has a GP of $650,000. This means the goods that she sold for $1M only cost her $350,000 to produce. Now she has $650,000 that can be used to pay for other bills like rent and utilities.

Mona can also compute this ratio in a percentage using the gross profit margin formula. Simply divide the $650,000 GP that we already computed by the $1,000,000 of total sales.

Gross Profit Percentage

$$65\% = \frac{\$1{,}000{,}000 - \$350{,}000}{\$1{,}000{,}000}$$

Mona is currently achieving a 65 percent GP on her clothes. This means that for every dollar of sales Mona generates, she earns 65 cents in profits before other business expenses are paid.

Net Profit Ratio

The net profit margin ratio tells us the amount of net profit per $1 of turnover a business has earned.

The net profit margin ratio is calculated as follows:

$$\text{Net Profit Margin} = \frac{\text{Net Profit}}{\text{Net Sales}}$$

Remember:

Net Profit = Gross Profit – Expenses

In some cases, you will find that some firms use the term net profit and in other cases, especially published accounts, they use profit after interest and taxation (PAIT). They both mean the same.

Net Profit Margin Analysis:

A profit margin of 17% means that for each dollar of sales the company generates it is contributing 17 cents to its bottom line (net income). This ties in with gross profit margin. In cutthroat pricing

industries such as retail and gasoline you would expect the profit margin much lower because of the heavy competition.

Example of the Net Profit Ratio

The Ottoman Tile Company has $1,000,000 of sales in its most recent month, as well as sales returns of $40,000, a cost of goods sold (CGS) of $550,000, and administrative expenses of $360,000. The income tax rate is 35%.

The calculation of its net profit percentage is:

1. $1,000,000 Sales - $40,000 Sales returns = $960,000 Net sales
2. $960,000 Net sales - $550,000 CGS - $360,000 Administrative = $50,000 Income before tax
3. $50,000 Income before tax x (1 - 0.35) = $32,500 Profit after tax
4. ($32,500 profit after tax / $960,000 Net sales) x 100 = 3.4% Net profit ratio

Return on assets or return on investment

Return on assets (ROA) is an indicator of how profitable a company is relative to its total assets. ROA gives an idea as to how efficient management is at using its assets to generate earnings.

Return on Assets	=	Net Income / Average Total Assets

This ratio can also be represented as a product of the profit margin and the total asset turnover.

The net income can be found on the income statement.

Example: XZ's Construction Company is a growing construction business that has a few contracts to build storefronts in downtown Cairo. XZ's balance sheet shows beginning assets of $1,000,000 and an ending balance of $2,000,000 of assets. During the current year, XZ's company had net income of $20,000,000. XZ's return on assets ratio is:

Return on Assets Analysis:

Return on Assets Ratio	
1,33.33 % =	$20,000,000 / ($1,000,000 + $2,000,000) / 2

This is an important ratio for companies deciding whether or not to initiate a new project. The basis of this ratio is that if a company is going to start a project, they expect to earn a return on it,

ROA is the return they would receive. Simply put, if ROA is above the rate that the company borrows at then the project should be accepted, if not then it is rejected. As you can see, XZ's ratio is 1,333.3 percent. In other words, every dollar that XZ's company invested in assets during the year produced $13.3 of net income. Depending on the economy, this can be a healthy return rate no matter what the investment is.

Now let us calculate the Return on Assets for the Alfa Warehouse; and here are the figures we need:

Alfa Warehouse	31 December 2022 $'000	25 December 2023 ..$'000
Profit for the financial period	38,159	16,327
Total Assets	436,758	44,190

Could we have earned more money (profit) if we had invested in a different business or simply put our money in the bank?

If the interest rates at the bank were somewhere around 4 or 5% in 2020 so we did better than that; but there are many businesses that have a ROA of higher than 8 or 9%. Still, in 2019 the Firm had an ROA of almost 37%: that's very good by all standards.

So what went wrong between 2019 and 2020? What happened, it didn't necessarily go wrong, was that the capital employed increased from $44,190,000 to $436,758,000 (a 10-fold

increase) but the profits increased from $16,327 to only $38,159… They only just about doubled. It's no surprise then that the ROA fell so sharply as capital employed increased 5 times faster than the profit did.

Return on equity:

One of the most important profitability metrics is return on equity [or ROE for short].

Return on equity is defined as follows:

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Shareholder Equity}} * 100$$

Shareholder equity is a creation of accounting that represents the assets created by the retained earnings of the business and the paid-in capital of the owners.

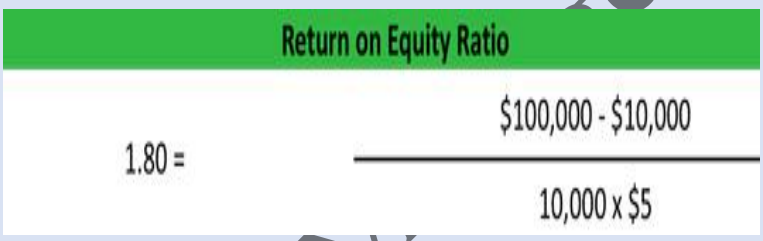
Things to remember

- If new shares are issued, then use the weighted average of the number of shares throughout the year.
- For high growth companies you should expect a higher ROE.
- Averaging ROE over the past 5-10 years can give you a better idea of the historical growth.

Example

Tammy's Tool Company is a retail store that sells tools to construction companies across the country. Tammy reported net income of $100,000 and issued preferred dividends of $10,000 during the year. Tammy also had 10,000, $5 par common shares outstanding during the year.

Tammy would calculate her return on common equity like this:



Return on Equity Analysis:

As you can see, after preferred dividends are removed from net income Tammy's ROE is 1.8. This means that every dollar of common shareholder's equity earned about $1.80 this year. An average of 5 to 10 years of ROE ratios will give investors a better picture of the growth of this company.

Consider the following example:

(in thousands except per share data)	Year 202X
Net Income	$21,906
Total Shareholders' Equity	222,192
Total liabilities and shareholders' equity	311,621

Now that we have the income statement and balance sheet in front of us, our only job is to plug the numbers into our equation. Let's plug the numbers into the formula.

$$\text{Return on Equity} = \frac{\$21,906,000}{\$222,192,000} * 100 = 9.86\%$$

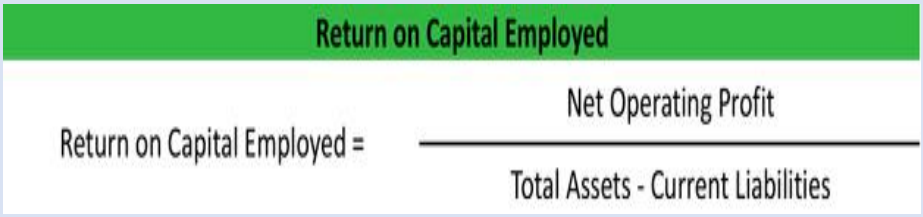
The answer is 0.0986, or 9.86%. This 9.86% is the return that management is earning on shareholder equity.

Return on Capital Employed

Return on capital employed or ROCE is a profitability ratio that measures how efficiently a company can generate profits from its capital employed by comparing net operating profit to capital employed. In other words, return on capital employed shows investors how many dollars in profits each dollar of capital employed generates.

Formula

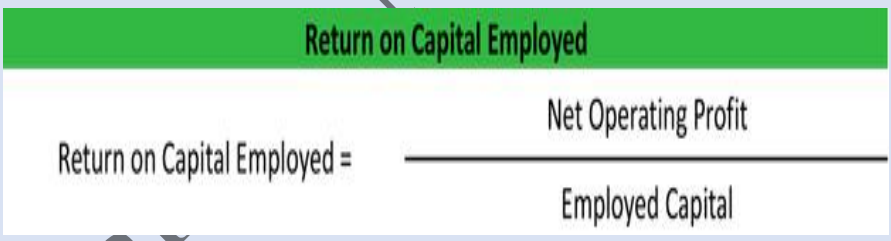
Return on capital employed formula is calculated by dividing net operating profit or EBIT by the employed capital.



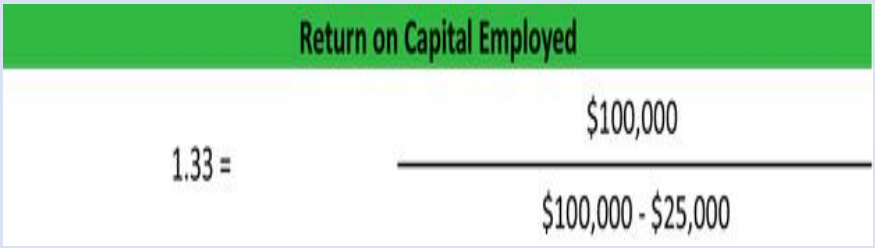
If employed capital is not given in a problem or in the financial statement notes, you can calculate it by subtracting current liabilities from total assets. In this case the ROCE formula would look like this:

Example

Scott's Auto Body Shop customizes cars for celebrities and movie sets. During the year, Scott had a net operating profit of $100,000. Scott reported $100,000 of total assets and $25,000 of current liabilities on his balance sheet for the year.



Accordingly, Scott's return on capital employed would be calculated like this:



As you can see, Scott has a return of 1.33. In other words, every dollar invested in employed capital, Scott earns $1.33. Scott's return might be so high because he maintains low assets level.

Analysis

The return on capital employed ratio shows how much profit each dollar of employed capital generates. Obviously, a higher ratio would be more favorable because it means that more dollars of profits are generated by each dollar of capital employed.

Earnings per Share:

The most widely used ratio, it tells how much profit was generated on a per share basis.

$$\text{Earning Per Share} = \frac{\text{Net Income After Tax}}{\text{Number of Ordinary Shares}}$$

If there are preferred shares, we should use this formula:

$$\text{Earnings Per Share} = \frac{\text{Net Income - Dividends on Preferred Stock}}{\text{Weighted Average Outstanding Common Shares}}$$

Things to remember

- If the company issues more shares, then EPS are much harder to compare to previous years.

Example:

Quality Co. has net income during the year of $50,000. Since it is a small company, there are no preferred shares outstanding. Quality Co. had 5,000 weighted average shares outstanding during the year. Quality's EPS is calculated like this.

As you can see, Quality's EPS for the year is $10. This means that if Quality distributed every dollar of income to its shareholders, each share would receive 10 dollars.

EPS Analysis:

The earnings per share ratio is mainly useful for companies with publicly traded shares. Most companies will quote the earnings per share in their financial statements saving you from having to calculate it yourself. By itself, EPS does not really show you a whole picture. But if you compare it to the EPS from a previous

quarter or year, it indicates the rate of growth a company earn is growing (on a per share basis).

Dividend Policy Ratios

Dividend policy ratios provide understanding of the dividend policy of the firm and the prospects for future growth. These ratios indicate the relationship of the firm's share price (market value) to dividends and earnings. We discuss two commonly used ratios, which are the dividend yield and payout ratios.

The Dividend Yield Ratio:

The dividend yield ratio compares the dividend per share against the price of the share and is calculated as:

$$\text{Dividend Yield} = \frac{\text{Dividends Per Share}}{\text{Share Price}}$$

$$\text{Dividends Per Share} = \frac{\text{Total Dividends}}{\text{Number of Shares}}$$

Things to remember

- It is interesting to note that there is strong correlation between dividend yields and market prices. Invariably, the higher the dividend, the higher the market value of the share.

- It is unusual that the share prices decrease when dividends increase. However, there could be number of reasons why this has happened, either due to the economy or to mismanagement, leading to a loss of faith in the stock market or in this stock.
- A high dividend yield does not necessarily translate into a high future rate of return. It is important to consider the prospects for continuing and increasing the dividend in the future.

Example:

ABC Company pays dividends of $4.50 and $5.50 per share to its investors in the current fiscal year. At the end of the fiscal year, the market price of its stock is $80.00.

Its dividend yield ratio is:

$$\frac{\$10 \text{ Dividends paid}}{\$80 \text{ Share price}}$$

$$= \%12.5$$

The Dividend Payout Ratio (Dividend Cover):

This ratio measures the extent of earnings that are being paid out in the form of dividends.

A higher cover would indicate that a larger percentage of earnings are being retained and re-invested in the business while a lower dividend cover would indicate the converse.

This ratio looks at the dividend payment in relation to net income and can be calculated as follows:

$$\text{Payout Ratio} = \frac{\text{Yearly Dividends}}{\text{Net income}}$$

$$\text{Payout Ratio} = \frac{\text{Yearly Dividends Per Share (DPS)}}{\text{Earnings Per Share (EPS)}}$$

Things to remember

- A reduction in dividends paid is looked poorly upon by investors, and the stock price usually depreciates as investors seek other dividend paying stocks.
- A stable dividend payout ratio indicates a solid dividend policy by the company's
- Generally, the low growth companies have higher dividends payouts and high growth companies have lower dividend payouts.

Example

Joe's Kitchen is a restaurant change that has several shareholders. Joe reported $10,000 of net income on his income statement for the year. Joe's issued $3,000 of dividends to its shareholders during the year.

Here is Joe's dividend payout ratio calculation.

Dividend Payout Ratio

$$30\% = \frac{\$3,000}{\$10,000}$$

Analysis

A consistent trend in this ratio is usually more important than a high or low ratio. Generally, more mature and stable companies tend to have a higher ratio than newer startup companies.

Price/Earnings Ratio (P/E ratio):

The price earnings ratio, often called the P/E ratio or price to earnings ratio, is a market prospect ratio that calculates the market value of a stock relative to its earnings by comparing the market price per share by the earnings per share.

The price-earning ratio is calculated as follows:

$$\text{P/E ratio} = \frac{\text{Market Price Per Share}}{\text{Current Earning Per Share}}$$

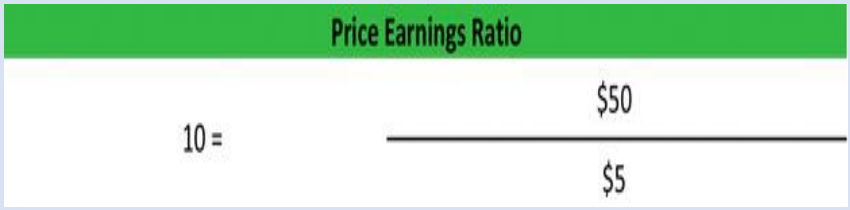
High P/E generally reflects lower risk and/or higher growth prospects for earnings.

Things to remember

- Generally, a high P/E ratio means that investors are anticipating higher growth in the future.
- The average market P/E ratio is 20-25 times earnings.
- The p/e ratio can use estimated earnings to get the forward-looking P/E ratio.
- Companies that are losing money do not have a P/E ratio.

Example:

The Island Corporation stock is currently trading at $50 a share and its earnings per share for the year is 5 dollars. Island's P/E ratio would be calculated like this:



As you can see, the Island's ratio is 10 times. This means that investors are willing to pay 10 dollars for every dollar of earnings. In other words, this stock is trading at a multiple of ten.

Price-Earnings Analysis:

The price to earnings ratio indicates the expected price of a share based on its earnings. As a company's earnings per share being to rise, so does their market value per share. A company with a high P/E ratio usually indicated positive future performance and investors are willing to pay more for this company's shares.

A company with a lower ratio, on the other hand, is usually an indication of poor current and future performance. This could prove to be a poor investment.

In general, a higher ratio means that investors anticipate higher performance and growth in the future. It also means that companies with losses have poor PE ratios.

An important thing to remember is that this ratio is only useful in comparing like companies in the same industry. Since this ratio is based on the earnings per share calculation, management can easily manipulate it with specific accounting techniques.

One thing to remember is that if a company has a low P/E ratio it doesn't necessarily mean that it is undervalued. The P/E doesn't dictate the stock price, in fact a low P/E could mean that the company's earnings are flat or growing slowing, they could also be in financial trouble. In fact the P/E ratio doesn't tell a whole lot, but it's useful to compare the P/E ratios of other companies in the same industry, or to the market in general, or against the company's own historical P/E ratios.

DuPont Equation

The DuPont equation is a handy way to analyze a company's financial position by merging the balance sheet and income statement using measures of profitability. DuPont merges ROA and ROE.

ROA is now defined using two other ratios we calculated: net profit margin and total asset turnover. ROA was calculated as net income divided by total assets.

Return on Assets = Net Income/Total Assets

ROE was calculated as net income divided by common equity).

Return on Equity= Net Income/Common Equity

The DuPont equation defines ROA as follows:

ROA= Net Profit Margin × Total Asset Turnover

Remembering that net profit margin is earnings available for shareholders divided by sales and total asset turnover is sales divided by total assets, we can make the following substitutions:

ROA= (earnings available for shareholders/sales) × (sales/total assets)

From this we see that sales will cancel out and ROA will become earnings available for shareholders divided by total assets.

ROA= earnings available for shareholders/total assets

This will give us the same number for ROA that was calculated using the original formula. However, the DuPont equation breaks it down into two components: profit on a company's sales and return to the use of a company's assets.

Drills and Exercises

1. Which of the following is not a current asset?

a. Inventory b. Prepaid Insurance c. Fixtures

2. Current asset MINUS current liabilities is the

a. current ratio b. net worth c. working capital

3. Current assets DIVIDED BY current liabilities is the

a. current ratio

b. the net worth ratio

c. working capital

4. The quick ratio EXCLUDES which of the following?

a. Accounts Receivable b. Inventory c. Cash

Use the following information to answer items 5 - 7:

At December 31 a company's records show the following information:

Cash	$ 10,000

Accounts Receivable	30,000
Inventory	80,000
Prepaid Insurance	6,000
Long-term Assets	200,000
Accounts Payable	30,000
Note Payable due in 10 months	25,000
Wages Payable	5,000
Long-term Liabilities	70,000
Stockholders' (Owner's) Equity	196,000

5. The company's working capital is

a. $60,000 b. $66,000 c. $196,000

6. The company's current ratio is

a. 1.0 : 1 b. 2.0 : 1 c. 2.1 : 1

7. The company's quick ratio is

a. 0.7 : 1 b. 1.0 : 1 c. 2.0 : 1

Use the following information to answer items 8 - 11:
For the year 2016 a company had Sales (all on credit) of $830,000 and Cost of Goods Sold of $525,000. At the beginning of 2016 its Accounts Receivable were $80,000 and its Inventory was $100,000. At the end of 2016 its Accounts Receivable were $86,000 and its Inventory was $110,000.

8. The inventory turnover ratio for the year 2006 was:

a. 4.8 b. 5.0 c. 7.9

9. The accounts receivable turnover ratio for the year 2016 was

a. 6.3 b. 7.5 c. 10.0

10. On average how many days of sales were in Accounts Receivable during 2016?

a. 27 b. 37 c. 49

11 On average how many days of sales were in Inventory during 2016?

a. 14 b. 46 c. 73

Use the following information for items 12 and 13:

A company's net income after tax was $400,000 for the year 2016. The company's income statement included Income Tax Expense of $140,000 and Interest Expense of $60,000. At the beginning of the year 2016 the company's stockholders' equity was $1,900,000 and at the end of 2006 it was $2,100,000.

12 What is the time interest earned for the company?

a. 6.7 b. 9.0 c. 10.0

13 What is the after-tax return on stockholder's equity for the year 2006?

a. 20% b. 25% d. 30%

14 The debt to equity ratio is computed as: (Total Liabilities ÷ Total _____ _____) : 1

15 Which of the following are likely to have the reported amounts on the balance being close to their current value?

a. Current Assets

b. Long-term Assets c. Stockholders' Equity

16. The following information for Alfa Company (Description: Engineering)

Consolidated Profit & Loss Account for the year ended		
Currency $ '000	**23**	**22**
Weeks	52	52
Turnover	**166402.0**	**180356.0**
Cost of sales	-147836.0	-160042.0
Gross Profit	**18566.0**	**20314.0**
Operating Expenses	-4785.0	-15399.0
Operating Profit	**13781.0**	**4915.0**
Other costs/income	0.0	0.0
Profit before interest and taxation	**13781.0**	**4915.0**
Net interest receivable (payable)	-1473.0	-1995.0
Profit on ordinary activities before taxation	**12308.0**	**2920.0**
Tax on profit on ordinary	-3169.0	-8810.0

activities		
Profit on ordinary activities after taxation	**9139.0**	**-5890.0**
Equity minority interests	-273.0	-212.0
Profit for the financial period	**8866.0**	**-6102.0**
Dividends	-5801.0	-5799.0
Retained profit	**3065.0**	**-11901.0**

Balance Sheet		
	23	**22**
Fixed assets		
Intangible Assets	15.0	18.0
Tangible Assets	42490.0	44945.0
Investments	6433.0	6230.0
Total Fixed Assets	**48938.0**	**51193.0**
Current assets		
Stock	25826.0	22485.0

Debtors due within one year	32441.0	36392.0
Short-term investments	0.0	0.0
Cash at bank and in hand	105809.0	106197.0
Total Current Assets	**164076.0**	**165074.0**
Creditors: Amounts falling due within one year	**-52922.0**	**-50195.0**
Net Current Assets (liabilities)	**111154.0**	**114879.0**
Total assets less current liabilities	**160092.0**	**166072.0**
Creditors: Amounts falling due after more than one year	-85689.0	-92134.0
Provisions for liabilities and charges	-4201.0	-5737.0
Net assets	**70202.0**	**68201.0**
Capital and reserves		
Called-up share capital	25596.0	25589.0
Share premium	444.0	432.0
Other reserves	22784.0	22764.0
Profit and loss account	18601.0	16160.0

Equity shareholders' funds	**67425.0**	**64945.0**
Minority interests	2777.0	3256.0
Total capital employed	**70202.0**	**68201.0**
Weighted average number of shares in issue in the period	**102385586**	**102357208**

a. Use these account statements to calculate possible financial ratios two-year period

b. Once you have your completed table, comment on the performance of the business over the two years highlighting the possible reasons for the changes that you identify.

17. The following are the financial statements of Good-buy Company:

Balance Sheet ($ in Millions)			
Assets	2023	Liabilities and Owners' Equity	2023
Current Assets		Current Liabilities	
Cash	400	Accounts Payable	200
Accounts Receivable	100	Notes Payable	100
Inventory	500	Total Current Liabilities	300
Total Current Assets	1000	Long-Term Liabilities	
		Long-Term Debt	800
Fixed Assets		Total Long-Term Liabilities	800
Property, Plant, and Equipment	1800	Owners' Equity	
Less Accumulated Depreciation	800	Common Stock ($1 Par)	500
Net Fixed Assets	1000	Capital Surplus	200
		Retained Earnings	200

		Total Owners' Equity	900
Total Assets	2000	Total Liab. and Owners' Equity	2000

Income Statement ($ in Millions) 2023	
Sales	2800
Cost of Goods Sold	2100
Administrative Expenses	100
Depreciation	526
Earnings Before Interest and Taxes	74
Interest Expense	30
Taxable Income	44
Taxes	19
Net Income	25
Dividends	3
Addition to Retained Earnings	22
Other Information	
Number of Shares Outstanding (Millions)	500
Price per Share	8.41

a. Calculate the following ratios:

1. Current Ratio
2. Quick Ratio
3. Receivables Turnover
4. Average collection period
5. Inventory Turnover
6. Fixed Assets Turnover
7. Total Assets Turnover
8. Times Interest Earned (TIE)
9. Debt Ratio
10. Profit Margin
11. Return on Assets (ROA)
12. Return on Equity (ROE)
13. Earnings Per Share (EPS)

b. Do you think that these ratios can help the company to analyze its performance in relationship to competitors? Why?

c. Discuss the problems in using financial ratios?

18. Here are parts of the profit and loss account for the Carphone Warehouse plc.; use that information to calculate its gross and net profit margin.

Carphone Warehouse		
Consolidated Profit and Loss Account for the year ended	**31 March 23**	**25 March 22**
	$'000	**$'000**
Turnover	**1,110,678**	**697,720**
Cost of sales	830,126	505,738
Gross profit	**280,552**	**191,982**
Operating expenses	176,960	129,359
Operating profit	**66,016**	**41,389**
Other costs/income	6,555	-5,132
Profit before interest and taxation	**45,012**	**25,300**
Net interest receivable (payable)	2,385	-196
Profit on ordinary activities before taxation	47,397	25,104
Tax on profit	-8,675	-8,831

Profit after taxation	38,722	16,273

19. Here is part of the profit and loss account for Marks Co. for two years. Compare these results by calculating the ratios named below and discuss what you find.

a. Gross profit margin

b. Operating profit margin

Consolidated profit and loss for the year	**Marks Co.**	
	23	**22**
	$m	**$m**
Turnover	8,135.4	8,075.7
Cost of sales	-6,862.5	-7,154.3
Gross profit	1,272.9	921.4
Operating expenses	-629.1	-480.9
Operating profit	643.8	440.5

20. Use the following information to fill in the blank of the next table

The Carphone Warehouse	**31 March 23 £'000**	**25 March 22 £'000**
Profit before interest and taxation	45,012	25,300
Total Fixed Assets	396,175	100,279
Total Current Assets	315,528	171,160

ROTA For the Carphone Warehouse			
31 March 2020	**ROTA**	_____	= _____%
25 March 2021	**ROTA**	_____	= _____%

21. Work through the data for Voda and calculate their current ratio for the two years for which you have data.

Voda Consolidated Balance Sheet	**31 March 23**	**31 March 22**
	£m	**£m**
Total Current Assets	9,438	18,182
Creditors: Amounts falling due within one year	13,455	12,377

a. Fill in this table and discuss what you find:

Current Ratio For Voda			
31 March 2020	Current Assets: Current Liabilities	_____: _____	___: 1
31 March 2019	Current Assets: Current Liabilities	_____: _____	___: 1

b. Fill in this table and discuss what you find:

Acid Test Ratio For Voda			
31 March 2020	Current Assets - Stocks: Current Liabilities	_____: _____	___: 1

25 March 2019	Current Assets - Stocks: Current Liabilities	_____: _____	___: 1

This additional information might help your analysis.

Current assets	23 £m	22 £m
Stock	513	316
Debtors due within one year	7,053	4,587
Short-term investments	1,792	13,211
Cash at bank and in hand	80	68
Total Current Assets	**9,438**	**18,182**
Creditors: Amounts falling due within one year	**13,455**	**12,377**
Net current assets (liabilities)	**-4,017**	**5,805**

22. Use the data:

Carphone Warehouse Consolidated Profit and Loss Account	31 March 2020	25 March 2019
for the year ended	£'000	£'000
Turnover	1,110,678	697,720

Total Fixed Assets	396,175	100,279
Total Current Assets	315,528	171,160

Fill in the tables and calculate the ratio values

Fixed Asset Turnover Ratio for the Carphone Warehouse		
31 March 22	_____	times
25 March 23	_____	times

What did you think of the results?

23. We need to calculate the current asset turnover ratio using the following information

Carphone Warehouse	23	22	Change
Turnover	1,110,678	697,720	59.19%
Total Current Assets	315,528	171,160	84.35%

24. Fill in the blanks with the data from the above table.

Current Asset Turnover Ratio for the Carphone Warehouse		
31 March 22	_____	times
25 March 23	_____	times

Chapter Two
Financial Forecasting

Financial Management

Chapter Two
Financial Forecasting
(Pro Forma Analysis)

OBJECTIVES

Financial statements deal with past decisions of firm. In this chapter we want to look at projecting operating performance and expected financial requirements with which to support future activities. Also, outside lenders need this kind of information for making lending decisions.

This chapter explains why and how financial managers project financial statements into the future. It is designed for an introduction to prepare students to deal with a real case in which pro-forma statements are needed. This chapter explains how to build pro forma income statement, the cash budget and pro forma balance sheet.

Hence, this chapter addresses the following subjects:

(1) About financial projection

(2) What are the pro forma statements

(3) Objectives and importance of pro forma statements.

(4) Pro forma income statement

(5) Pro forma cash flow (Cash Budget)

(6) Pro forma balance sheet

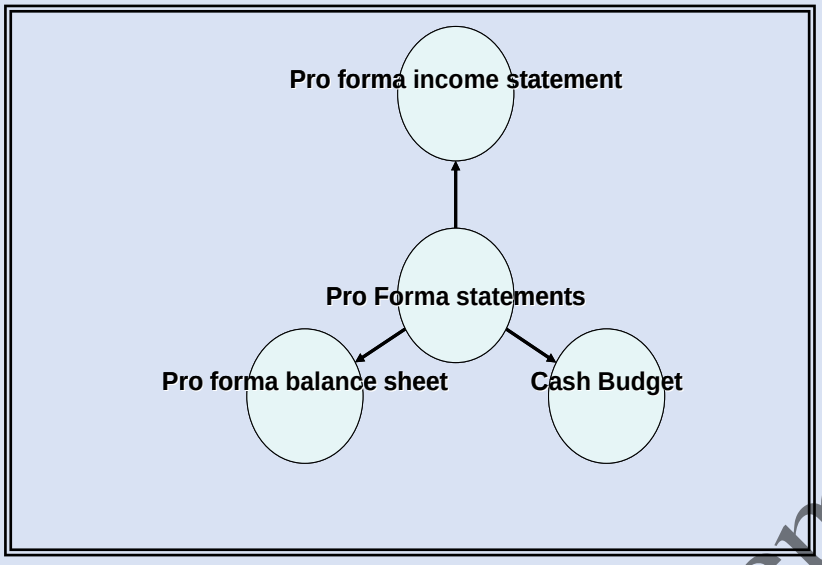
(7) Sales percentage method.

About Financial Projection

Like all business models, or any other projection of the future, financial projection is at best a very good educated guess. It depends on assumptions. It is a general tool that can be applied to millions of specific cases. It can always be improved, tailored, and customized. The objective of this part is to give you an understanding of the underlying assumptions, the mathematics, and the mechanics of the pro forma financial projections.

What are the Pro Forma Statements?

Expert opinions may vary, but most would agree there are three main financial statements in accounting and financial forecasting alike. These are sometimes called the Pro Forma Statements (Financial statements that project the results of future business operations), a verbal shortcut for a longer phrase.



As we see in the previous figure, it starts with the Pro Forma Profit and Loss, or Income Statement. This statement incorporates sales, Cost of sales (The costs associated with producing the sales), operating expenses (Expenses incurred in conducting normal business operations. Operating expenses may include wages, salaries, administrative and research and development costs, but excludes interest, depreciation, and taxes), and Profit (An accounting concept, normally the bottom line of the Income Statement, which is also called Profit or Loss statement). In most cases it should show sales less cost of sales as Gross margin (The difference between total sales revenue and total cost of goods sold, also called total cost of sales), and gross margin less operating expenses as profit before interest and taxes (Gross margin minus operating expenses; also called EBIT, for Earnings Before Interest and Taxes) (also called gross profit, and contribution to overhead). Normally there is also a projection of interest, taxes, and net profits

(The operating income less taxes and interest. The same as earnings, or net income).

The Pro Forma Cash Flow is the most important of the three main pro forma statements. Businesses run on cash. No business plan is complete without a Cash Flow plan. Some would call it a Cash Plan.

The Pro Forma Balance Sheet is the third of the main three: Aside from cash and income, there is the balance of assets, liabilities, and capital.

Pro Forma Income Statement

A pro forma income statement or profit and loss statement is similar to a historical income statement, except it projects the future rather than tracks the past.

The function of the pro forma income statement is different to that of the balance sheet. While the latter will include a reference to the retained profit of the company, it will only do this in the context of a source of finance for the company and will not indicate how the profit arose.

How to prepare a pro forma income statement

The pro forma income statement is a tabulation of the gross sales income to the company from which must be deducted all attributable costs. For the purpose of the business plan it will be necessary to prepare the first year's projected profit and loss

statement in some considerable detail. This is likely to require the year to be broken down into monthly figures or on a quarterly basis at the very least. For the remaining four years of the five-year business plan it will be adequate to produce annual profit and loss statements.

We need to follow these steps to prepare a pro forma income statement:

1. Establish a sales projection.
2. Determine a production schedule and associated use of new material, direct labor, and overhead to arrive at gross profit.
3. Compute other expenses.
4. Determine profit by completing the actual pro forma statement.

Example:

We assume that Coop Company needs to provide pro forma statement for the first 6 months of 2024. The company produces two products Product A and Product B. Projected sales of Product A 1,000 and 2,000 units of Product B at prices of $30 and $35 respectively.

- Now we can establish sales projection for the Coop Company:

Sales projection

	Product A	Product B	Total
Quantity Sales price Sales revenue	1000 $30	2000 $35	
Total	$30,000	$70,000	100,000

- We now determine the necessarily production plan for the six months' period.

Note that the number of products will depend on the inventory on the beginning of the period, the sales projection and the desired level of ending inventory. If we assume that the inventory in January is as follow:

Level of beginning inventory

	Product A	Product B
Quantity	85	180
Cost	$16	$20
Total Value	$1,360	$3,600
Total		$4,960

To determine the production plan for the six months we use the following formula:

+ Projected units of sales

+ Desired Ending inventory

- Beginning inventory

= Total production needed

Production requirements for 6 months

	Product A	Product B
+ Projected units of sales	+1000	+2000
+ Desired Ending inventory (10% of unit sales for the time period)	+100	+200
- Beginning inventory	-85	- 180
Total production needed	1,015	2,020

- Counting the total costs of production requirements for the 6 months: We assume the unit cost for production as stated in the next table then we count the total production costs as follow:

The total costs of production requirements

	Product A	Product B
Materials	$10	$12
Labor	5	6
Overhead	3	4
Total	$18	$22
Units to be produced	1,015	2,020
Total costs	$18,270	$44,440
		$62,780

- Now we allocate the manufacturing cost and determine the gross profit.

Allocation of manufacturing costs and determination of gross profits

	Product A	Product B	Combined
Quantity of Sales	1000	2000	3000
Sales price	$30	$35	
Sales revenue	**30,000**	**$70,000**	**$100,000**
Cost of goods:			
Cost of old inventory	$1,360*	$3,600*	
New inventory (the remainder)	$16,470**	$40,040**	
	$17,830	**$43,640**	**$61,470**
Gross Profits	**$12,170**	**$43,640**	**$38,530**

Note that:
*Old inventory: Product A 85 units at a $16 cost and Product B 180 units at a $18 cost.
** Quantity of new units' Product A 915 x cost per unit $18 quantity of new units' Product B 1,820 x $22

- At this point we compute the ending inventory to use it in

future use when constructing other pro forma statements.

+ Beginning inventory	$4,960
+ Total costs of production	62,710
Total inventory available	67,670
- cost of goods sold	61,470
= Ending inventory	**$6,200**

- Computing other expenses and constructing the pro forma income statement:

We assume that Coop Company has general administrative expenses of $12,000, interest expense of $1,500 and dividends of $1,500. Tax rate is 20%.

Pro forma income statement June 24

Sales revenue	$100,1000
Cost of goods sold	-61,470
Cross Profit	38,530
General and administrative expense	-12,000
Operating profit (EBIT)	**26,530**
Interest	-1,500
Earning before taxes	25,030
Taxes (20%)	-5,006

Earnings after Taxes (EAT)	**20,024**
Common stock dividends	1500
Increased In retained earnings	**$18,524**

Remember: Pro Forma Income Statement will not include the cost of the machinery on which the goods were produced or the cost of the factory, which was constructed for their manufacture.

Pro Forma Cash Flow (Cash Budget)

Cash flow is one of the most important aspects of running any business - large or small. It is one of the single most important reasons why many businesses fail - regardless of how good the business is. Managing cash flow therefore is vitally important in the smooth running, survival and success of a business.

What is Cash flow?

Cash flow refers to the money coming into a business from selling its products and the money it spends on all aspects of production.

An outflow of cash occurs when a company transfers funds to another party (either physically or electronically). Such a transfer could be made to pay for employees, suppliers and creditors, or to purchase long-term assets and investments, or even pay for legal expenses and lawsuit settlements.

It is important to note that legal transfers of value through debt - a purchase made on credit - is not recorded as a cash outflow until the money leaves the company's hands.

Remember not all cash transactions will appear in the Profit and Loss Account, some are recorded straight to the Balance Sheet. For example, issue of shares and disposal of assets. **Payments** of cash may be for one or more of the following.

- Purchase of stock.
- Payroll costs or other expenses.
- Purchase of capital items.
- Payment of interest, dividends and taxation.

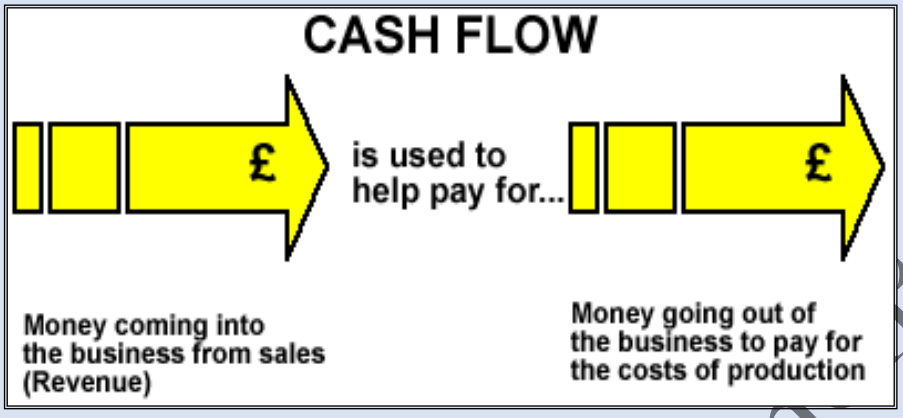
A cash inflow is the exact opposite; it is any transfer of money that comes into the company's possession. Typically, most a company's cash inflows are from customers, lenders (such as banks or bondholders) and investors who purchase company equity from the company. sometimes cash flows come from sources like legal settlements or the sale of company real estate or equipment.

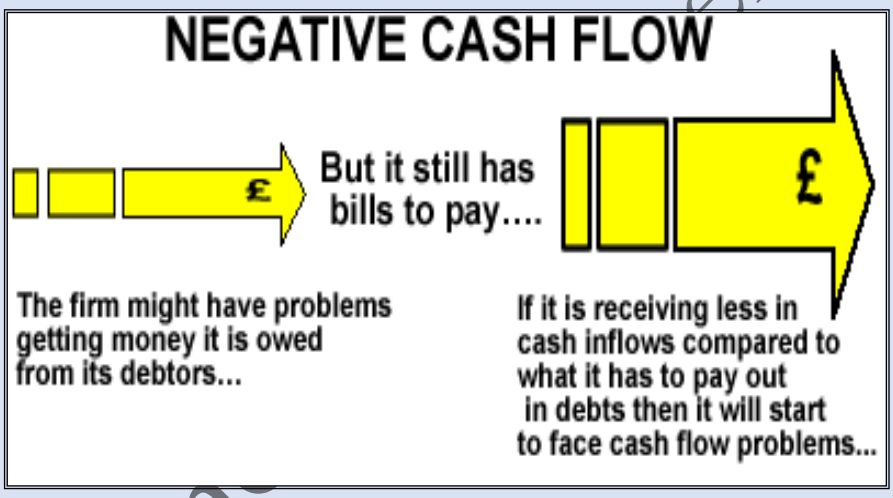
Receipt of cash may come from one or more of the following:

- Revenue (Cash sales).
- Payment of debtors (credit sales).
- The sale of fixed assets.
- The issue of new shares or loan stock.
- Receipt of interest and dividends from investments outside the business

The **revenue** companies receive depends on the amount they sell (Q) and the price that they charge (P). We can say therefore that:

Total Revenue (TR) = P x Q





The diagrams above help to understand this idea of a 'flow'. If the money coming into the business is more than that going out, the business will have a surplus of cash.

Flow vs. Income:

It is important to note the distinction between cash flow and 'profit'. These are two different things. Profit refers to the difference between the total revenue (TR) and total cost (TC) over a period.

Hence just because a company is bringing in cash does not mean it is making a profit (and vice versa).

What Is the Cash Budget or Cash Flow Statement?

Simply put, the cash flow statement records the company's cash transactions (the inflows and outflows) during the given period. It shows whether all those lovely revenues booked on the income statement have been collected. At the same time, however, remember that the cash flow does not necessarily show all the company's **expenses**: not all expenses the company accrues must be paid right away

The following is a list of the various areas of the cash flow statement and what they mean:

- ***Cash flow from operating activities*** - This section measures the cash used or provided by a company's **normal operations**. It shows the company's ability to generate consistently positive **cash** flow from **operations**. Think of "normal operations" as the core business of the company. For example, Microsoft's normal operating activity is **selling software**.
- ***Cash flows from investing activities*** - This area lists all the cash used or provided by the purchase and sale of **income-producing assets**. If a company, bought or sold companies

for a profit or loss, the resulting figures would be included in this section of the cash flow statement.

- ***Cash flows from financing activities*** - This section measures the flow of **cash** between a firm and its **owners and creditors**. Negative numbers can mean the company is servicing debt but can also mean the company is making dividend payments and stock repurchases, which investors might be glad to see.

A cash budget can show four positions as shown in the next table. Management will need to take appropriate action depending on the financial position.

REMEMBER

It should be obvious that the Profit or Loss made by an organization during an accounting period does not reflect its cash flow position for the following reasons:

1. Not all cash receipt affects profit and loss account income.
2. Not all cash payments affect profit and loss account expenditure.
3. Some costs in the profit and loss account such as profit or loss on sale of fixed assets or depreciation are not cash items but are costs derived from accounting conventions.
4. The timing of cash receipts and payments may not coincide with the recording of profit and loss account transactions. For example, dividend may be declared in 2019 and shown in profit and loss account for that year but the payment can be made in 2020.

Cash Flow Forecast Example

In most cases, a business should forecast for a 12-month period. However, we have cut our example down to 3 months, just so that you get the idea. In addition, we have simplified the content (listings on the left-hand-side) to make it easier to follow and understand.

Example:

Company X has been working as a small Transport company and intends to start up in a new business project using $150,000 thousands. The company has an account with a Bank with a minimal balance but intends to approach the bank for the necessary additional finance.

Company X asks you for advice and provides the following additional information.

1. Arrangements have been made to purchase fixed assets costing $80,000 thousands. These will be paid for at the end of September and are expected to have a five-year life, at the end of which they will possess a nil residual value.
2. Stocks costing $50,000 thousands will be acquired on 28 September and subsequently monthly purchases will be at a level sufficient to replace forecast sales for the month.
3. Forecast monthly sales are in thousands: $30,000 for October 2021, $60,000 for November and December, and $105,000 from January 2022 on- wards.
4. Selling price is fixed at the cost of stocks plus 50%.

5. Two month's credit will be allowed to customers but one month's credit will be received from suppliers of stock.
6. Running expenses, including rent but excluding depreciation of fixed assets are estimated at $16,000 thousands per month, depreciation is counted as 10% of the total fixed asset per year.
7. The company intends to make monthly cash drawings of $10,000 thousands.

Prepare a cash budget for six months to 31 March 2025.

SOLUTION

The opening cash balance at 1 October 2024 will consist of the company initial $150,000 thousands less the $80,000 thousands expended on fixed assets purchased in September. In other words, the opening balance is **$70,000** thousands. Cash **receipts** from credit customers arise in two months after the relevant sales.

Payments to suppliers are a little trickier. We are told that cost of sales is 100/150* sales. Thus for October cost of sales is 100/150* $30,000,000 = $20,000,000. These goods will be purchased in October but not paid until November. Similar calculations can be made for the later months. The initial stocks of $50,000,000 is purchased in September and consequently paid for in October.

The cash budget can now be prepared as follows:

Monthly Receipts

	Sep	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
Sales	--	30	60	60	105	105	105
Collections	--	--	--	30	60	60	105
Total cash receipts	--	--	--	30	60	60	105

Monthly Payments

	Oct	Nov	Dec	Jan	Feb	Mar
Payments						
Suppliers	50	20	40	40	70	70
Expenses	16	16	16	16	16	16
Drawings	10	10	10	10	10	10
Total Payments	76	46	66	66	96	96

Cash budget for the six month ending 31 March 2022 in $Millions

	Oct	Nov	Dec	Jan	Feb	Mar
Total Receipts	--	--	30	60	60	105
Total Payments	76	46	66	66	96	96
Net cash flow (Surplus / Deficit)	(76)	(46)	(36)	(6)	(36)	9
Beginning cash Balance	70	(6)	(52)	(88)	(94)	(130)
Ending cash balance	(6)	(52)	(88)	(94)	(130)	(121)

Cash budget analysis

As stated above Cash budget assist the managers to forecast their future cash requirements and therefore make necessary arrangements beforehand. As in the above case it shows that the

maximum cash deficit which the business is going to face is $121,000,000.

Some of the remedies include:

- Postponing purchase of fixed assets or use finance lease to acquire the assets thereby releasing cash.
- Negotiate a quicker payment period for customers or negotiate for more credit days with the suppliers.
- Obtain a bank short loan, or negotiate a bank overdraft.
- Reduce the level of monthly drawings if possible.

Example (Coop Company):

Now you remember the example of Coop company that we discussed when performing the pro forma income statement. The next table show anticipated sales of the company of total $100,000 over the first 6 months according to the following Collection policies:

- 20% of sales is collected in the month of sales
- 80% in the following month
- Sales of December is $12,000

Monthly sales in Dollars

Jan.	Feb.	March	April	May	June
15,000	10,000	15,000	25,000	15,000	20,000

According to this information we now prepare the monthly cash receipts table

	Dec.	Jan.	Feb.	March	April	May	June
Sales	12,000	15,000	10,000	15,000	25,000	15,000	20,000
Collections (20% of current sales)		3,000	2,000	3,000	5,000	3,000	4,000
(80% 0f previous month sales)		9,600	12,000	8,000	12,000	20,000	12,000
Total cash receipts		12,600	14,000	11,000	17,000	23,000	16,000

Now we count the monthly cash payments according to the following payment policies as follow:

- We assume all the costs are incurred on equal monthly basis.
- We shall pay for materials one month after purchasing. Other payment will be based on direct monthly cash outlays.
- Purchased of materials in Dec. was $4,500
- We will purchase of $8,000 new equipment in Feb. and $10,000 in June.

Cost of manufactured goods

	Product A			Product B			Combined cost
	Units produced	Cost p/u	Total Cost	Units produced	Cost p/u	Total Cost	
Materials	1,015	$10	$10,15	2,020	$12	$24,240	$34,39
Labor	1,015	5	5,075	2,020	6	12,120	17,195
Overhead	1,015	3	3,045	2,020	4	8,080	11,125

Average monthly manufacturing costs			
	Total costs	Time frame	Average Monthly
Materials	$34,390	6 months	$5,732
Labor	17,195	6 months	2,866
Overhead	11,120	6 months	1,854

Summary of all monthly payments							
	Dec.	Jan.	Feb.	March	April	May	June
Monthly materials purchases	$4,500	$5,732	$5,732	$5,732	$5,732	$5,732	$5,732
Payment for materials (prior month purchase)		4,500	$5,732	$5,732	$5,732	$5,732	$5,732
Monthly Labor cost		2,866	2,866	2,866	2,866	2,866	2,866
Monthly overhead		1,854	1,854	1,854	1,854	1,854	1,854
General and administrative expenses (12000 over 6 months)		2,000	2,000	2,000	2,000	2,000	2,000
Interests							1,500
Taxes (two equal payments)				2,503			2,503
Cash dividend							1,500
New equipment			8,000				10,000
Total Payments		11,220	20,452	14,955	12,452	12,452	27,953

We assume that the company beginning cash balance is 5000 and it desires a minimum ending cash balance of $5000

Monthly cash flow						
	Jan.	Feb.	March	April	May	June
Total receipts	12,600	14,000	11,000	17,000	23,000	16,000
Total payments	11,220	20,452	14,955	12,452	12,452	27,953
Net cash flow	1,380	(6,452)	(3,955)	4,548	10,548	(11,953)

Cash budget with borrowing and repayment provisions						
	Jan.	Feb.	March	April	May	June
Net cash flow	1,380	(6,452)	(3,955)	4,548	10,548	(11,953)
Beginning cash balance	5,000	6,380	5,000	5000	5000	11,069
Cumulative cash balance	6,380	(72)	1,045	9,548	15,548	(884)
Monthly loan or (repayment)						
Cumulative loan balance	-----	5,072	3,955	(4,548)	(4,479)	5,884
Ending cash balance	-----	5,072	9,027	4,479	-----	5,884
	6380	5,000	5,000	5,000	11,069	5000

The Pro-Forma Balance Sheet

The balance sheet will be a statement of the source of funds for the business in terms of loans, equity participation and retained profit and how these have been allocated.

After the pro forma income statement and cash budget were developed, the balance sheet can be developed using some of the information derived from the income statement. Here also, specific assumptions must be made about each account.

Example (Coop Company):

Now we are in the position to use these two statements to construct the pro forma balance sheet. We need to integrate this information into the balance sheet of the prior period. The last balance sheet dated December 31, 2023 shown in the following table.

Coop balance sheet of 31/12/2023

Current assets	
Cash	$5,000
Marketable securities	3,200
Accounts receivable	9,600
Inventory	4,960

Total current assets	22,760
Plant and equipment	27,740
Total assets	**50,500**
Accounts payable	4,500
Notes payable	0
Long term debt	15,000
Common stock	10,500
Retained earnings	20,500
Total liabilities and stockholders' equity	**50,500**

- To construct the pro forma balance sheet for June 30, 2024 we should notice that:
  - Some items from the old balance sheet will remain unchanged. These items are (marketable securities, long-term debt and common stock)
  - Other items will be changed according to the pro forma income statement (inventory and retained earnings) and cash budget (cash, account receivable, plant and equipment, account payable and notes payable).

Coop Pro Forma Balance Sheet of Jun 30, 24	
Current assets	
1. Cash	$5,000
2. Marketable securities	3,200
3. Accounts receivable	16,000
4. Inventory	6,200
Total current assets	30,400
5. Plant and equipment	45,740
Total assets	**$76,140**
6. Accounts payable	5,732
7. Notes payable	5,884
8. Long term debt	15,000
9. Common stock	10,500
10. Retained earnings	39,024
Total liabilities and	
Stockholders' equity	**$76,140**

Explanation of the items of pro forma balance sheet:

- cash (5,000) minimum cash balance.
- Marketable securities remain ($3,200) unchanged.
- Accounts receivable (16,000) based on June sales of $20,000 (80% will be accounts receivable at the end of June.
- Inventory ($6,200) – ending inventory.

- Plant and equipment ($ old value $27,740 + Purchases during the period 18,000 = $45,740).
- Accounts payable ($5,732) based on June purchases. This will be paid in July)
- Note payable ($5,884) – the amounts that will be borrowed to maintain 5,000 cash balance.
- Long term debt ($15,000) remains unchanged.
- Common stock ($10,000) remains unchanged.
- Retained earnings (initial value $20,500 + retained earnings from pro forma income statement $18,524 = $39,024)

We can notice from the pro forma balance sheet that assets increase by $25,640 ($**76,140**- $50,500). This growth was financed using accounts payable, notes payable and retained earnings.

Although the company will have a high degree of profit it will look for banks to finance the growth of assets (the difference between the increase of accounts payable and retained profits as a source of finance and growth of assets [$25,640 - ($18,524 + $1,232 = $5,884)]

Using the formula to calculate the required external fund:

Identifying the funds which must be raised to support the forecasted sales level is one of the key outputs of the forecasting

process. This amount is known as the External Financing Needed (EFN) or Additional Funds Needed (AFN).

Instead of preparing a set of forecasted financial statements, you can also calculate your external financing needs (EFN) by using a formula that looks at three changes:

We need to know:

- Required increases to assets given a change in sales. Formula = (A/S) x (Δ Sales).
- Required increases to liabilities given a change in sales. Note: Long term debt does not increase with a change in sales and is typically excluded.
- Required increases to retained earnings as a result of income less any distributions

Balance Sheet ($ in Millions)			
Assets	**2023**	**Liabilities and Owners' Equity**	**2023**
Current Assets		**Current Liabilities**	
Cash	200	Accounts Payable	400
Accounts Receivable	400	Notes Payable	400
Inventory	600	***Total Current Liabilities***	800
Total Current Assets	1200	**Long-Term Liabilities**	

		Long-Term Debt	500
Fixed Assets		Total Long-Term Liabilities	500
Net Fixed Assets	800	**Owners' Equity**	
		Common Stock ($1 Par)	300
		Retained Earnings	400
		Total Owners' Equity	700
Total Assets	**2000**	***Total Liab. and Owners' Equity***	**2000**

Income Statement ($ in Millions)	
	2023
Sales	1200
Cost of Goods Sold	900
Taxable Income	300
Taxes	90
Net Income	210
Dividends	70
Addition to Retained Earnings	140

The equation used to calculate EFN when fixed assets are being utilized at full capacity is given below.

$$EFN = \frac{A_0^*}{S_0}(S_1 - S_0) - \frac{L_0^*}{S_0}(S_1 - S_0) - (PM)(S_1)(b)$$

(Please note that we assume Profit Margin and the Retention Ratio are constant.)

Where:

- S0 = Current Sales,
- S1 = Forecasted Sales = S0(1 + g),
- g = the forecasted growth rate is Sales,
- A*0 = Assets (at time 0) which vary directly with Sales,
- L*0 = Liabilities (at time 0) which vary directly with Sales,
- PM = Profit Margin = (Net Income)/(Sales), and
- b = Retention Ratio = (Addition to Retained Earnings)/ (Net Income).

When the firm is utilizing its assets at full capacity, A*0 will equal Total Assets. L*0 typically consists of Accounts Payable (and if present Accruals). The logic of underlying this equation can be explained as follows.

$\frac{A_0^*}{S_0}(S_1 - S_0)$ = the required increase in Assets,

$\frac{L_0^*}{S_0}(S_1 - S_0)$ = the "spontaneous" increase in Liabilities, and

$(PM)(S_1)(b)$ = the "spontaneous" increase in Retained Earnings.

The increased in Liabilities and Retained Earnings in the equation are considered "spontaneous" because they occur essentially automatically as a consequence of the firm conducting its business.

Full Capacity Example

Use the Balance Sheet and Income Statement above to determine the EFN given that Fixed Assets are being utilized at full capacity and the forecasted growth rate in Sales is 25%.

Solution:

First calculate the Forecasted Sales.

S1 = 1200(1 + .25) = $1500

Next, solve using the EFN equation.

Note that we are substituting (Net Income)/(Sales) for Profit Margin and (Addition to Retained Earnings) / (Net Income) for the Retention Ratio.

$$EFN = \frac{2000}{1200}(1500-1200) - \frac{400}{1200}(1500-1200) - \left(\frac{210}{1200}\right)(1500)\left(\frac{140}{210}\right) = \$225$$

Exercises

1. According to the accounting profession, which of the following would be considered a cash-flow item from an "investing" activity?
    - cash inflow from interest income.
    - cash inflow from dividend income.
    - cash outflow to acquire fixed assets.
    - all of the above.
2. According to the Financial Accounting Standards Board (FASB), which of the following is a cash flow from a "financing" activity?

- cash outflow to the government for taxes.
- cash outflow to shareholders as dividends.
- cash outflow to lenders as interest.
- cash outflow to purchase bonds issued by another company.

3. On an accounting statement of cash flows an "increase (decrease) in cash and cash equivalents" appears as

- a cash flow from operating activities.
- a cash flow from investing activities.
- a cash flow from financing activities.
- none of the above.

4. Which of the following is NOT a cash outflow for the firm?
5. Full Capacity exercise. The following is the balance sheet accounts of the year ending December 31, 2020.

Company X Balance sheet on December 31, 2023 ($Millions)

Assets		Liability & Equity	
Cash	5	AP	15
AR	15	Leases payable	6
Inventory	30	Taxes	4
Net Fixed Ass.	40	Papers payable	30
		Common stock	15
		Retained earnings	20
Total Assets	90	Total Liability & Equity	90

The sales of the company on December 31, 2023 was $1,000,000, EAT is 5%. The dividends in 2020 were 30% of net profit. The company intends to have the same dividend policy. What are the financial needs of the company to maintain the growth of sales by 10%?

6. The following is the balance sheet accounts of the year ending December 31, 2023, for El-salaam Co.

Assets		Liability & Equity	
Cash	20	AP	100
AR	170	Tax & expenses	50
Inventory	200	Bonds	140

Net Fixed Ass.	300	Common stock	200
		Retained earnings	200
Total Assets	690	Total Liability & Equity	690

The sales of the company in December 31, 2023 was $1,000,000, EAT is 4% and the net profit was $40,000. The dividends in 2016 was $20,000 (50% of net profit). The company intend to have the same dividend policy. What are the financial needs of the company to maintain the growth of sales to reach $1,600,000?

7. Use the Balance Sheet and Income Statement below to answer the following questions.

Balance Sheet ($ in Millions)

Assets	2023	**Liabilities and Owners' Equity**	2023
Current Assets		Current Liabilities	
Cash	200	Accounts Payable	150
Accounts Receivable	600	Notes Payable	390
Inventory	900	*Total Current Liabilities*	540
Total Current Assets	1700	Long Term Liabilities	
		Long Term Debt	1380
Fixed Assets		*Total Long-Term Liabilities*	1380
Net Fixed Assets	1700	Owners' Equity	
		Common Stock	1020
		Retained Earnings	460
		Total Owners' Equity	1480
Total Assets	3400	*Total Liabilities and Owners' Equity*	3400

Income Statement ($ in Millions)	
	2023
Sales	2300
Costs	1600
Taxable Income	700
Taxes	141
Net Income	559
Dividends	385
Addition to Ret. Earnings	174
Forecasted Growth Rate	32%

- Calculate the forecasted Sales level
- Express Accounts Receivable as a percentage of Sales.
- Find the Pro-Forma balance for Cash.
- Find the Pro-Forma balance for Retained Earnings on the Balance Sheet.
- Find the External Financing Needed given that Fixed Assets are being utilized at full capacity.

Financial Management

Chapter Three
Break-Even Analysis

Chapter Three
Break-Even Analysis

OBJECTIVES:

When a business is starting up or planning a new project it will want to know whether the income from the project will cover the running costs – in other words it will want to know if it will break-even and make a profit. The business will also want to know how many items, whether they are manufactured goods or services, it needs to sell to cover its running costs and break-even. This chapter will address the following subjects related to the break-even analysis:

- The concept and method of break-even analysis
- The break-even point in units
- Desired profit in units
- The break-even point in dollars
- Desired profit in sales dollars

The concept and method of break-even analysis

Break-even analysis is a technique widely used by production management, financial managers and management accountants. It is based on categorizing production costs between those which are "variable" (costs that change when the production output changes) and those that are "fixed" (costs not directly related to the volume of production).

Total variable and fixed costs are compared with sales revenue in order to determine the level of sales volume, sales value or production at which the business makes neither a profit nor a loss (the "break-even point").

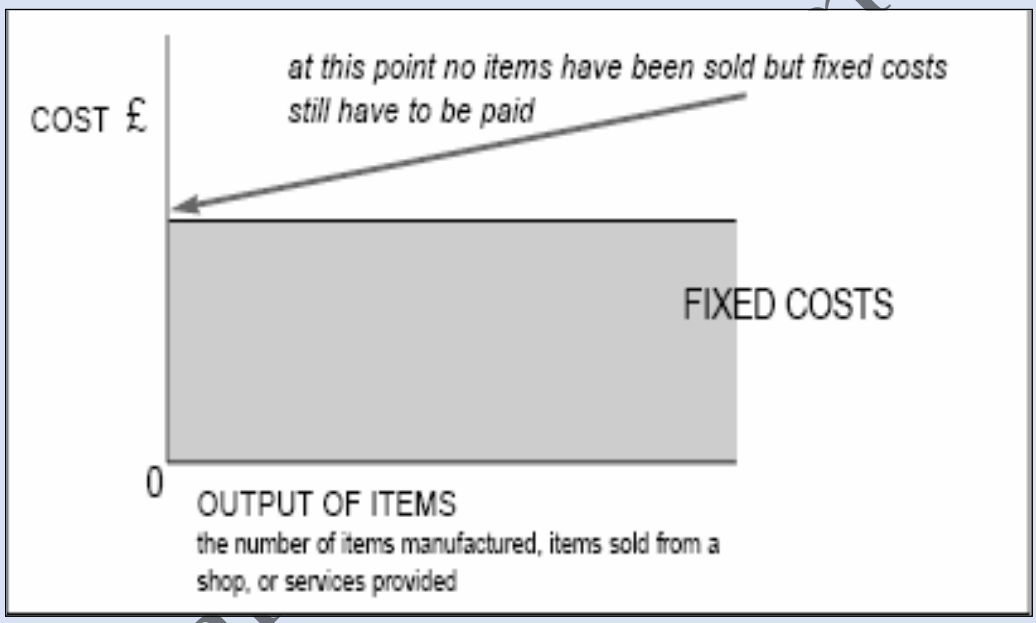
To assist with our explanations, we will use a fictional company Oil Change Co. (a company that provides oil changes for automobiles). In spite of the categories of costs as will be discussed, for the purpose of explaining the break-even analysis, we will categorize costs as fixed and variable costs.

When calculating break-even we need to tell the difference between two types of running costs: fixed costs and variable costs.

Fixed cost

Fixed costs are running costs such as rent and insurance which have to be paid anyway, whatever the number of items sold by the business. Even if the business closes down for two weeks holiday and nothing is sold, the fixed costs still have to be paid.

Fixed costs can be shown in the form of a graph which shows the cost ($) and the number of items produced, 'the output'. Remember that an item can be an item made in a factory, an item sold in a shop, or a service provided. As you can see in the graph below, the fixed costs of a business remain at the same level, however many items are produced – the line on the graph is a horizontal straight line.



In other words, even if the business has a zero output or high output, the level of fixed costs will remain broadly the same. In the long-term fixed costs can alter - perhaps as a result of investment in production capacity (e.g. adding a new factory unit) or through the growth in overheads required to support a larger, more complex business.

Examples of fixed costs:

- Rent and rates
- Depreciation
- Research and development
- Marketing costs (non- revenue related)
- Administration costs

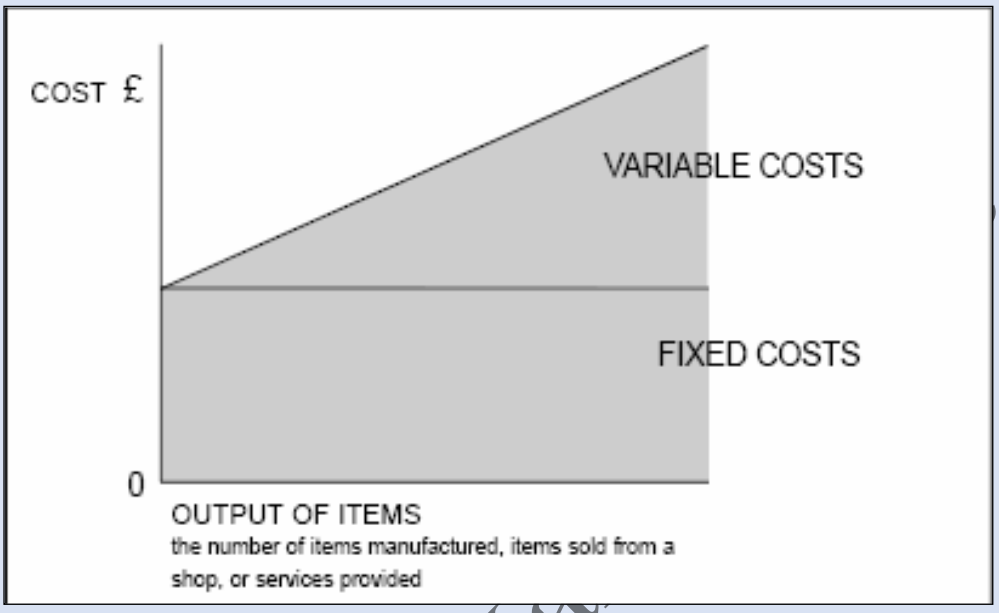
In our example, at Oil Change Co. the following items have been identified as fixed expenses. The amount shown is the fixed expense per week:

Labor including payroll taxes and benefits	$1,200
Rent and utilities for the building it uses	700
Depreciation, office and professional, training, other	500
Total fixed expenses *per week*	$2,400

Variable Costs

Variable costs are running costs which are related to the production of the item itself. Variable costs include expenses such as purchases of materials, stock, fuel and revenue-related costs such as commission. and in the case of a manufacturer, the wages paid to production line employees. If the output is nil, variable costs will be zero, if the output increases, so does the total variable cost. As you

can see from the straight line on the graph below, total variable costs rise as the number of items produced rises.



A distinction is often made between "Direct" variable costs and "Indirect" variable costs. **Direct** variable costs are those which can be directly attributable to the production of a particular product or service and allocated to a particular cost centre. Raw materials and the wages those working on the production line are good examples.

Indirect variable costs cannot be directly attributable to production, but they do vary with output. These include depreciation (where it is calculated related to output - e.g. machine hours), maintenance and certain labor costs.

At Oil Change Co. the following items have been identified as variable expenses. Next to each item is the variable expense per car or per oil change:

Motor oil	$ 5.00
Oil filter	3.00
Grease, washer fluid	0.50
Supplies	0.20
Disposal service	0.30
Total variable expenses *per car*	$ 9.00

Revenue or sales

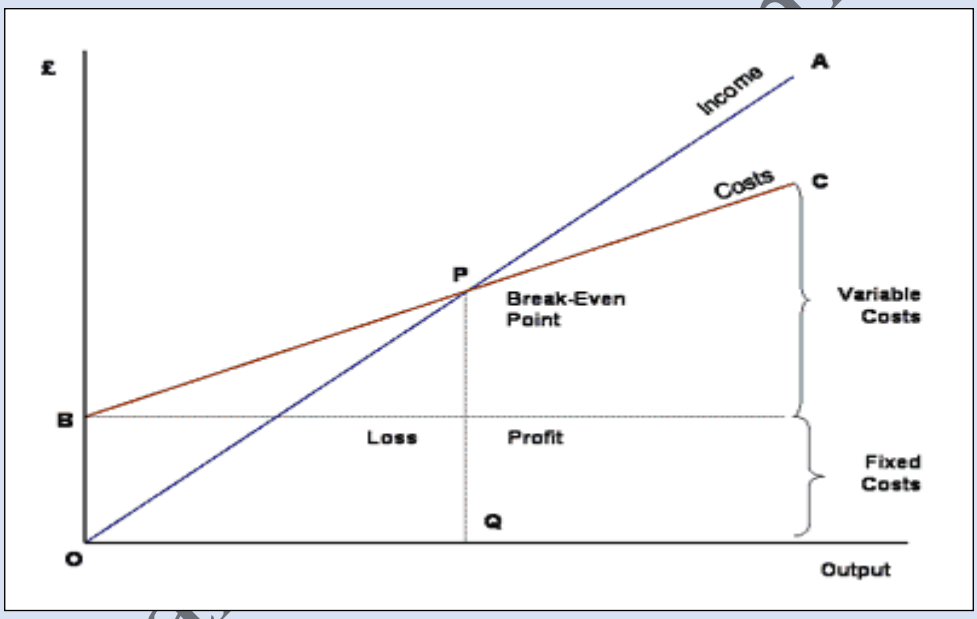
Revenues (or sales) at Oil Change Co. are the amounts earned from servicing cars. Oil Change Co. charges one flat fee of $24 for performing the oil change service. For $24 the company changes the oil and filter, adds needed fluids, adds air to the tires, and inspects engine belts.

At the present time no other service is provided and the $24 fee is the same for all automobiles regardless of engine size.

As the result of its pricing, if Oil Change Co. services 10 cars its revenues (or sales) are $240. If it services 100 cars, its revenues will be $2,400.

Break-even chart

In its simplest form, the break-even chart is a graphical representation of costs at various levels of activity shown on the same chart as the variation of income (or sales, revenue) with the same variation in activity. The point at which neither profit nor loss is made is known as the "break-even point" and is represented on the chart below by the intersection of the two lines.



In the diagram bellow, the line OA represents the variation of income at varying levels of production activity ("output"). OB represents the total fixed costs in the business. As output increases, variable costs are incurred, meaning that total costs (fixed + variable) also increase. At low levels of output, Costs are greater than Income. At the point of intersection, P, costs are exactly equal to income, and hence neither profit nor loss is made.

Contribution margin

An important term used with break-even point or break-even analysis is contribution margin. The result of subtracting all variable expenses from revenues. It indicates the amount available from sales to cover the fixed expenses and profit. In equation format it is defined as follows:

The contribution margin for one unit of product or one unit of service is defined as:

Contribution Margin per Unit = Revenues per Unit – Variable Expenses per Unit

At Oil Change Co. the contribution margin per car (or per oil change) is computed as follows:

Contribution Margin per car	=	Revenues per car	–	Variable Expenses per car
Contribution Margin per car	=	$24	–	$9
Contribution Margin per car	=	**$15**		

The contribution margin per car lets you know that after the variable expenses are covered, each car serviced will provide or contribute $15 toward the Oil Change Co.'s fixed expenses of

$2,400 per week. After the $2,400 of weekly fixed expenses has been covered the company's profit will increase by $15 per car serviced.

The break-even point in units

The break-even point in units for Oil Change Co. is the number of cars it needs to service in order to cover the company's fixed and variable expenses. The break-even point formula is to divide the total amount of fixed costs by the contribution margin per car:

$$(BEQ)(1) = \frac{\text{Fixed Costs (FC)}}{\text{Price (P)} - \text{Variable Costs (VC)}}$$

$$= \frac{\text{Fixed Costs (FC)}}{\text{Contribution Margin per car}}$$

Break-even Point in Cars per Week = Fixed Expenses per week ÷ Contribution Margin per car

Break-even Point in Cars per Week = $2,400 per week ÷ $15 per Car

Break-even Point in Cars per Week = **160 Cars per Week**

It's always a good idea to check your calculations. The following table confirms that the break-even point is 160 cars per week:

Oil Change Co. Projected Net Income For a Week	
Sales (160 cars serviced at $24 per car)	$ 3,840
Variable Expenses (160 cars at $9 per car)	– 1,440
Contribution Margin	2,400
Fixed Expenses	– 2,400
Net Income	$ 0

Desired profit in units

Let's say that the owner of Oil Change Co. needs to earn a profit of $1,200 per week rather than merely breaking even. You can consider the owner's required profit of $1,200 per week as another fixed expense. In other words the fixed expenses will now be $3,600 per week (the $2,400 listed earlier plus the required $1,200 for the owner). The new point needed to earn $1,200 per week is shown by the following break-even formula:

Break-even Point in Cars per Week = Fixed Expenses per week ÷ Contribution Margin per car
Break-even Point in Cars per Week = $3,600 per week ÷ $15 per Car
Break-even Point in Cars per Week = **240 Cars per Week**

Always check your calculations:

The above table confirms that servicing 240 cars during a week will result in the required $1,200 profit for the week.

Oil Change Co. Projected Net Income For a Week	
Sales (240 cars serviced at $24 per car)	$ 5,760
Variable Expenses (240 cars at $9 per car)	– 2,160
Contribution Margin	3,600
Fixed Expenses	– 2,400
Net Income	$ 1,200

The breakeven point in dollars

One can determine the break-even point in sales dollars (instead of units) by dividing the company's total fixed expenses by the contribution margin ratio.

The contribution margin ratio is the contribution margin divided by sales (revenues).

The ratio can be calculated using company totals or per unit amounts. We will compute the contribution margin ratio for the Oil Change Co. by using its per unit amounts:

Revenues or Sales per car	$24
Variable Expenses per car	– 9
Contribution Margin per car	$15

Contribution Margin Ratio	=	Contribution Margin	÷	Revenues or Sales
	=	$15	÷	$24
	=	**62.5%**		

The break-even point in sales dollars for Oil Change Co. is:

Break-even Point in Sales $

= Total Fixed Expenses ÷ Contribution Margin Ratio

Break-even Point in Sales $

= $2,400 per week ÷ 62.5%

Break-even Point in Sales $ = $3,840 per week

We can use another formula:

$$(BEQ)(2) = \frac{FC}{1 - \frac{\text{VC per unit}}{\text{Price per unit}}}$$

$$\textbf{Break-even Point in Cars per Week} = \frac{\$2,400 \text{ per week}}{1 - \frac{\$9}{\$24}}$$

$$= \frac{\$2,400}{1 - 0.375}$$

$$= \frac{\$2,400}{0.625}$$

$$= \textbf{\$3,840 per Week}$$

The break-even point of $3,840 of sales per week can be verified by referring back to the break-even point in units. Recall there were 160 units necessary to break-even. At $24 per unit the necessary sales in dollars would be $3,840.

Desired profit in sales dollar

Let's assume a company needs to cover $2,400 of fixed expenses each week plus earn $1,200 of profit each week. In essence the company needs to cover the equivalent of $3,600 of fixed expenses each week.

Presently the company has annual sales of $100,000 and its variable expenses amount to $37,500 per year. These two facts result in a contribution margin ratio of 62.5%:

Sales	$100,000
Variable Expenses	– 37,500
Contribution Margin	$ 62,500

Contribution Margin Ratio	=	Contribution Margin	÷	Sales
	=	$62,500	÷	$100,000
	=	**62.5%**		

The amount of sales necessary to give the owner a profit of $1,200 per week is determined by this break-even point formula:

Break-even Point in Sales $ per week = Fixed Expenses per week ÷ Contribution Margin Ratio

= $3,600 per week ÷ 62.5%

= **$5,760 per week**

To verify that this answer is reasonable, we prepared the following schedule:

	Per Week	52 Weeks
Sales	$ 5,760	$ 299,520
Variable Expenses (37.5%)	– 2,160	– 112,320
Contribution Margin	3,600	187,200
Fixed Expenses	– 2,400	– 124,800
Profit	$ 1,200	$ 62,400

As you can see, for the owner to have a profit of $1,200 per week or $62,400 per year, the company's annual sales must triple. Presently the annual sales are $100,000 but the sales need to be $299,520 per year in order for the annual profit to be $62,400.

REMEMBER

Break-even is reached when the income from sales of a product is equal to the running costs of producing that product

Costs include:

- *Variable costs* – costs such as raw materials and stock that are directly related to the number of items produced

- *Fixed costs* – overheads such as insurance and rates – that have to be paid anyway and do not vary with the number of items produced

In break-even calculations:

- The break-even point can be calculated by means of a formula and by the construction of a break-even chart
- The break-even chart helps the business calculate how much profit it will make at different levels of production.

Drills and Exercises[5]

1.	Fixed Expenses do not change *in total* when there is a modest change in sales.	True	False
2.	An example of a fixed expense would be a 5% sales commission.	True	False
3.	Property taxes and rent are often fixed expenses.	True	False
4.	Variable expenses change *in total* as volume changes.	True	False
5.	An example of a variable expense is an office manager's monthly salary.	True	False
6.	A retailer's cost of goods sold is an example of a variable expense.	True	False
7.	Contribution margin is defined as sales (or revenues) minus variable expenses.	True	False

8.	Breakeven point is the point where revenues equal the total of all expenses including the cost of goods sold.	True	False
9.	The break-even point *in dollars* of revenues is equal to the total of the fixed expenses divided by the contribution margin per unit.	True	False
10.	If a company requires a profit of $30,000 (instead of breaking even), the $30,000 should be combined with the fixed expenses in order to compute the point at which the company will earn $30,000.	True	False
11.	If a company has mixed expenses, the fixed component can be combined with the company's fixed expenses and the variable component can be combined with the company's variable expenses.	True	False
12.	Decreasing a company's fixed expenses should reduce the break-even point.	True	False

13.	The contribution margin per unit is the selling price per unit minus the fixed expenses per unit.	True	False
14.	Breakeven analysis is useful for companies that sell products, but it is not useful for companies that provide services.	True	False

Use this information to answer questions 15 through 17:

Selling Price per unit	$ 17
Fixed Expenses	
Selling & Administrative	$ 130,000
Interest Expense	$ 10,000
Variable Expenses	
Cost of Goods Sold	$ 4
Selling & Administrative	$ 3

15. What is the company's contribution margin?

$10 $13 $14

16. What is the break-even point in units?

10,000 14,000 20,000

17. If the company wants to earn a profit of $42,000 instead of breaking even, what is the number of units the company must sell?

14,000 18,200 26,000

Use this information to answer questions 18 through 20:

Fixed Expenses	
Rent	$ 24,000
Salaries	$ 40,000
Depreciation	$ 13,000
Variable Expenses	
Cost of Goods Sold	58% of sales
Supplies	7% of sales
Sales Commissions	5% of sales

18. What is the company's contribution margin ratio?

30% 70% Cannot be determined

19. What is the break-even point in dollars?

$77,000 $110,000 $256,667

20. If the company wants to earn a profit of $35,000 instead of breaking even, what is the amount of sales or revenue dollars the company must achieve?

$112,000 $145,000 $373,333

Financial Management

Chapter Four Cost of Capital

Financial Management

Chapter Four
Cost of Capital

OBJECTIVES

For many businesses, the issue about where to get funds from for starting up, development and expansion can be crucial for the success of the business. It is important, therefore, that you understand the various sources of finance open to a business and are able to assess how appropriate these sources are in relation to the needs of the business. This chapter addresses the cost of capital and how to count it.

Cost of capital

The cost of capital has two aspects to it:

- The cost of funds that a company raises and uses, and the return that investors expect to be paid for putting funds into the company.
- It is therefore the minimum return that a company should make on its own investments, to earn the cash flow out of which investors can be paid their return.

The cost of capital is an opportunity cost of finance, because it is the minimum return which an investor requires. For shareholders it is the dividend they expect to receive plus a capital

gain on the value of their shares, while for loan holders it is the rate of interest which is quoted on the loan. Failure to pay such required return will result in the providers of finance transferring their holdings to other opportunities with a better rate of return.

Computing the Cost of Capital is important to the management of a firm and to investors in the firm. Some uses include:

1. Valuing the entire company, valuing the common stock.

2. Selecting internal projects that will add value for investors (owners) - avoiding value destroying projects.

3. Determining value added by management. Is the current compensation package fair to management and shareholders?

4. Valuing mergers, acquisitions, and spin offs.

5. Evaluating planned changes in a firm's capital structure - selling bonds, retiring equity etc.

6. Understanding inadvertent changes in a firm's capital structure - Stock price rises, greater portion of capital is in stock, less in debt - Interest rates drop, bond prices increase, portion of capital from debt increases etc.

Sources of Capital for Corporations:

What is the difference between financial structure and capital structure?

- Financial Structure
  - The whole right-hand side of the balance sheet.
  - Includes both short-term and long-term sources of financing (debt and equity)
- Capital Structure
  - How the firm finances its invested capital.
  - Excludes accruals and accounts payable – short-term liabilities that are not strictly debt contracts, that spontaneously change in response to the operations of the business.
  - Includes:
    - Bank Loans
    - Bonds (Long-term debt)
    - Common stock and retained earnings
    - Preferred Stock

Hence, each of these components has a cost. Costs associated with financing the firm's invested capital including:

1. Equity Costs:
   - Common equity costs
   - Preferred equity costs
2. Debt Costs:

- Bank loans
- Long-term debt – bonds/debentures

We can determine the cost of each capital component in the next pages.

Counting the Cost of Equity

- **The total market value** of equity (market capitalization) is the price per share times the number of shares outstanding:

$$S = P_0 \times n$$

Retained Earnings and Common Shares

After company makes money (earnings), who owns that money? The shareholders, right? But when you retain earnings you are not giving the money to the shareholders. You are keeping it. In a way, you are investing it for them in your company. Well those shareholders want some return on that money you are keeping. How much return do they expect? They want the same amount as if they had gotten the retained earnings in the form of dividends, and bought more stock in your company with them.

That is the cost of retained earnings. You as a financial genius, have to ensure that if you are retaining earning, that the

shareholders will get at least as good a return on the money as if they had re-invested the money back into the company.

Sources of Common Equity:

- Retained Earnings
- Sales of new shares

- The costs of these two sources are different because there are no Flotation costs on retained earnings

We must estimate common stockholders' required rate of return. Two ways to calculate cost of common equity

- CAPM approach
- Dividend growth model

CAPM Approach

The first way is The Capital Asset Pricing Model CAPM "Cap-M" looks at risk and rates of return and compares them to the overall stock market. If you use CAPM you have to assume that most investors want to avoid risk, (risk averse), and those who do take risks, expect to be rewarded.

Advantages:

- Simple and uses variables with values readily available from public sources

- can be applied to companies that do not pay dividends or do not expect constant rate of dividend growth.
- considers risk

Disadvantages

- Estimates for market risk premium, beta
- Uses past data to predict future

Combines:

- Risk Free rate (krf)
- Systematic risk or Beta (B)
- Market Risk Premium or Expected rate of return for market or average security less the risk free rate km – krf
- Kcs = krf + B (km – krf)

Example:

- Beta is 1.4; Risk-free rate is 3.75%; Expected market rate is 12%
- 0.0375 + 1.4 (0.12 - 0.0375) = 15.3%

Dividend Growth Model

The second way is the Dividend Growth Model, in which you divide the dividend by the price of common stock and add the growth rate. We will use this model in our discussion of the

weighted average capital costs

Advantages of dividend growth model

- Simple/ Easy to understand

Disadvantages of dividend growth model

- Works only for firms that pay dividends
- Assumes a constant growth rate
- Estimate of cost of equity very sensitive to growth rate
- Does not consider risk

Investors' required rate of return estimates:

- Growth through retained earnings:

Kcs = D1/Pcs + g

- Issue new common stock

Kncs = D1/NPncs + g

Where NPncs is net proceeds after flotation costs.

Example:

A company expects dividends this year to be $2.20, based upon the fact that $2 were paid last year. The firm expects dividends to grow 10% next year and into the foreseeable future. Stock is trading at $50 a share. Flotation costs for issuing new stock is $7.50/SHARE.

Cost of retained earnings:

- Kcs = D1/Pcs+ g
- 2.20/50 + 0.10 = 14.4%

Cost of new stock:

- Kncs = D1/NPncs + g
- 2.20/(50 -7.50) + 0.10 = 15.18%

Why is the cost of retained earnings cheaper than the cost of issuing new common stock?

- When a company issues new common stock they also have to pay flotation costs to the underwriter.
- Issuing new common stock may send a negative signal to the capital markets, which may depress the stock price.

Counting Cost of Preferred Stock

$$S = P_0 \times n$$

- **The market value** of all preferred stock is simply the price per share times the number of shares outstanding.

Cost of preferred stock = $\dfrac{\text{Preferred Stock Dividend}}{\text{Net Price of Preferred Stock}}$

Cost of preferred stock (K_{ps}) = D/ P_{ps}

- Preferred dividends are not tax-deductible, so no tax

adjustments necessary. Just use Kps.

- Nominal Kps is used.

Example:

Star Enterprises has an issue of preferred stock with a $9 dividend that just sold for $80 per share. What is the firm's cost of preferred stock?

Kps = 9/80

= .1125 = 11.25%

Note: our calculation ignores possible flotation costs however if there are some flotation cost we should substitute from the price of shares.

Example

Annual dividend $5, Stock price $65 and flotation costs of $1.50

Kps = 5/(65 - 1.50) = 5/(63.50) = .07874

or

Cost of preferred stock = 7.874%

Counting Cost of Debt (Bonds)

- **The market value** of bonds will differ from their book value only if required rates of return in the market have changed since the bonds original issue.

- Knowing the term to maturity, the coupon rate and the bondholder's required return we can determine the **market value** of **bonds** with the following equation.

$$B = I \times \left[\frac{1 - \frac{1}{(1+k_b)^n}}{k_b} \right] + F \times \frac{1}{(1+k_b)^n}$$

Where:

I = interest (or coupon) payments

kb = the bond discount rate (or market rate)

n = the term to maturity

F = Face (or par or principal) value of the bond

- Once you know the market value of the bonds, you multiply their price by the number of bonds outstanding to determine total market value.

B= P b × n

The rate of return anticipated on a bond if it is held until the maturity date. YTM is considered a long-term bond yield expressed as an annual rate. The calculation of YTM takes into account the current market price, par value, coupon interest rate and time

to maturity. It is also assumed that all coupons are reinvested at the same rate. Sometimes this is simply referred to as "yield" for short.

An approximate YTM can be found by using a bond yield table. However, because calculating a bond's YTM is complex and involves trial and error, it is usually done by using a programmable business calculator. We can calculate YTM by the following formula.

Cost of dept before tax = YTM (Yield to maturity)

$$YTM = \frac{\text{Annual interest payment} + \dfrac{\text{Principal payment} - \text{Present price of bond)}}{\text{Number of years}}}{\dfrac{\text{(Present price of bond + Principal payment)}}{2}}$$

How are interest payments treated with respect to calculating taxes?

- Interest payments are deductible expenses
- Interest payments decrease tax obligation!
- Every $1 paid in interest saves $1 x T in taxes, where T = corporate tax rate

After tax cost of debt is the cost we are interested in.

After tax cost of debt = Kd x (1-T)

Example:

A $1000 par value bond pays a 12% coupon rate. The bond currently sells for $1125. The bond matures in 10 years. The firm's marginal tax rate is 34%.

a). What is the before tax cost of debt?

b). What is firm's after-tax cost of debt?

Payment = $1000 x 12% = $120

n = 10

Present price = 1125

Principal payment = 1000

$$\text{YTM} = \frac{120 + \dfrac{1000 - 1125}{10}}{0.5\,(1125 + 1000)}$$

= 107.5/(1062.5)

YTM = before tax cost of debt = 10.12%

b) After-tax cost of debt = rd x (1-T)

After-tax cost of debt = 10.12% x (1- 0.34)

= 6.68%

Example:

Debt at 9.75% and tax rate of 34%

After-tax cost of debt = .0975(1-.34) = 6.435%

Weighted Average Cost of Capital WACC:

The appropriate weights assigned to each capital component are derived from the firm's optimal capital structure. The optimal capital weights minimize the firm's WACC for a given structure of component capital costs.

Weighted average cost of capital (WACC) is the return that the providers of a company's capital require. Calculating it requires knowing the rates of return required for each source of capital.

The weighted average cost of capital (WACC) serves three primary purposes:

1. To evaluate capital project proposals before-the-fact.
2. To set performance targets in order for management to sustain or grow market values, and
3. to measure management performance after-the-fact.

Steps in calculating the WACC

1. Identify the relevant sources of capital (debt and equity).
2. Estimate the market values for the sources of capital and determine the market value weights.
3. Estimate the marginal, after-tax, and after-floatation cost for each source of capital.
4. Calculate the weighted average.

Once you have the specific marginal costs of capital (after accounting for taxes and floatation costs) and you have found the appropriate weights to use, the actual calculation of a WACC is a simple matter.

$$WACC = K_a = K_e\left(\frac{S}{V}\right) + K_d(1-T)\left(\frac{D}{V}\right)$$

The cost of **e**quity times the market value weight of equity

The cost of debt after tax times the market value weight of debt

Example

Assume a firm has $10 million in total assets. Debt, preferred stock, and common stock are used in the proportions of 43%, 11%, and 4.6%, respectively, to pay for the assets. The dollar amount from each capital component can be counted using the WACC as follow:

From the previous table: WACC is the sum of the weighted specific marginal costs of each source of capital. The cost of capital is 9.55%.

Example

Nile Tel Ltd after-tax cost of debt = 10%; the cost of preferred stock = 11%; the cost of retained earnings equity = 15%. The optimal weights are 50% for debt, 20% for preferred stock, and 30% for equity.

(1)	(2)	(3)	(4) = (2)*(3)
Type of Capital	Costs	Optimal Weights	Weighted Cost
Debt	10%	50%	0.05
Preferred Stock	11%	20%	0.022
Retained earnings	15%	30%	0.045
		WACC =	**11.7%**

Example

A firm borrows money at 6% after taxes and pays 10% for equity. The company raises capital in equal proportions – 50/50

WACC = (.06 X .5) + (.1 X .5) = .08 or 8%

Example

Company XXK Calculated the following:

Divisional cost of capital

Different target ratios for debt/equity mix per division

Different pretax cost of debt for each division

What factors influence a company's composite WACC?

Division	Cost of Equity x ratio	Cost of Debt x ratio	WA COC
Restaurant	(12.20 X .7)	(5.54 X .3)	10.20
Snack Foods	(11.56 X .8)	(5.23 X .2)	10.29
Beverages	(11.77 X .74)	(5.28 X .26)	10.08

1. Market conditions.
2. The firm's capital structure and dividend policy.
3. The firm's investment policy. Firms with riskier projects generally have a higher WACC.

Exercises

1. Alexandria Enterprises has an issue of preferred stock with a $9 dividend that just sold for $80 per share. What is the firm's cost of preferred stock?

2. Given the following information:

YZ Company Limited

Balance Sheet

as at January 30, 2021

ASSETS		**LIABILITIES:**	
Current Assets	$147,000	Current Liabilities	$75,250
Net Fixed Assets	15,000,250	8.5% 2020 Mortgage Bonds	4,000,000
		Common stock (1,000,000 outstanding)	7,155,000
		Retained earnings	3,917,000
TOTAL ASSETS	**$15,147,250**	**TOTAL LIABILITIES & EQUITY**	**$15,147,250**

Calculate the Market Value of Capital Components:

- Market price for common stock = $21.50

- Bonds are trading for 95% of face value
- Face value of bonds are $1,000

3. EGY3 Industries has 6.5 million shares of commons stock outstanding with a market price of $14 per share. The company also has outstanding preferred stock with a market value of $10 million, and 25,000 bonds outstanding, each with a face value of $1,000 and selling at 90% of par value. The bonds pay an annual coupon of 8% and have 10 years to maturity. The risk free rate is 4% and the return on the market is 14%. The firm's beta is 1.2. Preferred stock is selling at a price of $20 per share and pays a dividend of $2 per share. The firm's tax rate is 40%. What is the firm's WACC?
4. Capital structure for Cairo Corp. is provided below. The company plans to maintain its capital structure in the future. If the firm has a 6% after-tax cost of debt, a 13.5% cost of preferred stock, and a 19% cost of common stock, what is the firm's weighted cost of capital?

Capital Structure in thousands	
Bonds	$1100
Preferred Stock	250
Common Stock	3700

Financial Management

Chapter Five
Capital Budgeting

Chapter Five
Capital Budgeting

OBJECTIVES

This chapter addresses the following models related to capital budgeting:

1. Payback period
2. Net present value
3. Internal rate of return

Capital Budgeting Models[6,7]

What is capital budgeting?

- Analysis of potential additions to fixed assets.
- Long-term decisions; involve large expenditures.
- Very important to firm's future.

There are a number of capital budgeting models available that assess and rank capital expenditure proposals. Let's take a look at three of the most common models for evaluating business investments:

1. Payback period
2. Net present value
3. Internal rate of return

While each of these models has its benefits and drawbacks, sophisticated financial managers prefer the net present value and the internal rate of return methods. There are two reasons why these models are favored:

(a) all of the cash flows over the entire length of the project are considered, and

(b) the future cash flows are discounted to reflect the time value of money.

The following table highlights the differences among the four models:

Method	Information Used	Time Period Covered	
1.	**Payback**	Cash Flows – Not Discounted	Until Cash is Recovered
2.	**Net Present Value**	Discounted Cash Flows	Entire Life of Project
3.	**Internal Rate of Return**	Discounted Cash Flows	Entire Life of Project

*What is the difference between independent and mutually exclusive projects or investments***?**

- Independent projects – if the cash flows of one are unaffected by the acceptance of the other.
- Mutually exclusive projects – if the cash flows of one can be adversely impacted by the acceptance of the other.

Evaluating a Capital Expenditure and Investments

Let's use the capital budgeting models to evaluate a potential business investment at Xirr Manufacturing, Inc.:

- Xirr Manufacturing must decide whether or not it should buy a new machine to replace its existing machine.
- The old machine is fully depreciated and would be scrapped with no expected salvage value (no proceeds).
- The new machine costs $100,000 and is expected to have no salvage value at the end of its useful life of 8 years.
- The following table shows the net cash flow of the firm.

Xirr Manufacturing, Inc.

Relevant Cash Flows

	Amount Paid for Machine	Net Cash Flows Before Discounting
Today	(100,000)	(100,000)
Year 1		21,087
Year 2		24,847
Year 3		23,447
Year 4		22,717
Year 5		22,419
Year 6		23,186
Year 7		24,029
Year 8		23,551

Using Payback Period

This method of evaluating business investments uses **cash flows** (not the accounting net income flows) to measure the amount of time it takes for a company to recoup its investment dollars. So a payback period is the number of years required to recover a project's cost, or "How long does it take to get our money back?"

How to calculate the payback period?

- By adding project's cash inflows to its cost until the cumulative cash flow for the project turns positive.

Using the **net cash flows before discounting** in the table above, the payback period on the new machine for Xirr is **4.35 years**:

Year 1	21,087				
Year 2	24,847				
Year 3	23,447				
Year 4	22,717				
Subtotal	**92,098**				
Year 5	7,902	÷	22,419	=	0.35 year
Total	**100,000**				

Example

- We are going to assume that the project we are considering approving has the following cash flow. Right now, in year zero we will spend 15,000 dollars on the project. Then for 5 years we will get money back as shown.

Year	Cash flow
0	-15,000
1	+7,000
2	+6,000
3	+3,000
4	+2,000
5	+1,000

When exactly do we get our money back, when does our project break even?

Solution

Year	Cash flow	Running Total	
0	-15,000	-15,000	
1	+7,000	-8,000	(so after the 1st year, the project has not yet broken even)
2	+6,000	-2,000	(so after the 2nd year, the project has not yet broken even)

3	+3,000	+1,000	(so the project breaks even sometime in the 3rd year)

Well, at the beginning of the second year we still had a -2,000 balance, right? So we do this.

Negative Balance / Cash flow from the Break Even Year	=	When in the final year we break even
-2,000 / 3,000	=	.666

So we broke even 2/3 of the way through the 3rd year. So the total time required to payback the money we borrowed was 2.66 years.

Strengths and weakness of Payback model

- Strengths
  - Provides an indication of a project's risk and liquidity.
  - Easy to calculate and understand.
- Weaknesses
  - Ignores the time value of money.
  - Ignores CFs occurring after the payback period.

Discounted payback period

It is almost the same as payback, but before you figure it, you first discount your cash flows. You reduce the future payments by your cost of capital. Why? Because it is money you will get in the future, and will be less valuable than money today.

Example

CF_t	-100	10	60	
PV of CF_t	-100	9.09		60.11
Cumulative	-100	-90.91	-	

Disc $Payback_L$ = 2 + 41.3 / 60.11 = 2.7

Example: let's say the cost of capital is 10% and cash flow information as follow:

Year	Cash flow	Discounted Cash flow	Running Total
0	-15,000	-15,000	-15,000
1	7,000	6,363	-8,637
2	6,000	4,959	-3,678
3	3,000	2,254	-1,424
4	2,000	1,366	-58
5	1,000	621	563

- So we break even sometime in the 5th year. When?
- Negative Balance / Cash flow from the Break Even Year = -58 / 621
- When in the final year we break even =.093

Net Present Value

This method of evaluating business investments estimates all of the cash flowing in and out of a project. The estimated cash flows are then discounted to the present to reflect the time value of money.

This technique is referred to as a **discounted cash flow model** or a **present value model** because it brings all of the estimated future cash amounts back to the present time. Using our Xirr Manufacturing example, the estimated cash flows in Year 5 will be discounted more than the estimated cash flows in Year 1 because cash received in the future is less valuable than cash received today.

Present value tables and financial calculators allow us to discount future cash amounts to the present time. Below is a portion of a present value table. It shows the value today (the present value) of receiving (or paying) one dollar at various points in time when the time value of money is 12%:

Time	**12%**
Today (or start of project)	1.00
One year from today (or from start)	0.89
Two years from today	0.80
Three years from today	0.71
Four years from today	0.64

Five years from today	0.57
Six years from today	0.51
Seven years from today	0.45
Eight years from today	0.40
Nine years from today	0.36
Ten years from today	0.32
……..	
20 years from today	0.10
30 years from today	0.03

From this table you can see that if the time value of money is 12%, receiving $1.00 in ten years is equivalent to receiving $0.32 today.

In the net present value model the company must specify the rate it will use for discounting the future cash flows. (The rate selected will likely be the minimum that the company needs to earn on the project after uncertainties, risks, and the company's cost of capital are considered.)

The combination of the present value of the cash inflows and the present value of the cash outflows is known as the **net present**

value.

Net present value calculations take the following two inputs:

- Projected net cash flows in successive periods from the project.
- A target rate of return i.e. the hurdle rate.

Where,

Net cash flow equals total cash inflow during a period, including salvage value if any, less cash outflows from the project during the period.

Hurdle rate is the rate used to discount the net cash inflows. Weighted average cost of capital (WACC) is the most commonly used hurdle rate.

Calculation Methods and Formulas

The first step involved in the calculation of NPV is the estimation of net cash flows from the project over its life. The second step is to discount those cash flows at the hurdle rate.

The net cash flows may be even (i.e. equal cash flows in different periods) or uneven (i.e. different cash flows in different periods). When they are even, present value can be easily calculated by using the formula for present value of annuity. However, if they are uneven, we need to calculate the present value of each individual net cash inflow separately.

Once we have the total present value of all project cash flows, we subtract the initial investment on the project from the total present value of inflows to arrive at net present value.

Thus we have the following two formulas for the calculation of NPV:

When cash inflows are even:

$$NPV = R \times \frac{1 - (1 + i)^{-n}}{i} - \text{Initial Investment}$$

In the above formula:

- **R** is the net cash inflow expected to be received in each period;

- **i** is the required rate of return per period;
- **n** are the number of periods during which the project is expected to operate and generate cash inflows.

When cash inflows are uneven:

$$NPV = \left[\frac{R1}{(1+i)1} + \frac{R2}{(1+i)2} + \frac{R3}{(1+i)3} + ... \right] - \text{Initial Investment}$$

Where,

i is the target rate of return per period;
R1 is the net cash inflow during the first period;
R2 is the net cash inflow during the second period;
R3 is the net cash inflow during the third period, and so on ...

Decision Rule

In case of standalone projects, accept a project only if its NPV is positive, reject it if its NPV is negative and stay indifferent between accepting or rejecting if NPV is zero.

In case of mutually exclusive projects (i.e. competing projects), accept the project with higher NPV.

Examples

Example 1: Even Cash Inflows: Calculate the net present value of a project which requires an initial investment of $243,000 and it is

expected to generate a cash inflow of $50,000 each month for 12 months. Assume that the salvage value of the project is zero. The target rate of return is 12% per annum.

Solution

We have,

Initial Investment = $243,000

Net Cash Inflow per Period = $50,000

Number of Periods = 12

Discount Rate per Period = 12% ÷ 12 = 1%

Net Present Value:

= $50,000 × (1 − (1 + 1%)^-12) ÷ 1% − $243,000

= $50,000 × (1 − 1.01^-12) ÷ 0.01 − $243,000

≈ $50,000 × (1 − 0.887449) ÷ 0.01 − $243,000

≈ $50,000 × 0.112551 ÷ 0.01 − $243,000

≈ $50,000 × 11.2551 − $243,000

≈ $562,754 − $243,000

≈ $319,754

Example 2: Uneven Cash Inflows: An initial investment of $8,320 thousand on plant and machinery is expected to generate cash inflows of $3,411 thousand, $4,070 thousand, $5,824 thousand and $2,065 thousand at the end of first, second, third and fourth year

respectively. At the end of the fourth year, the machinery will be sold for $900 thousand. Calculate the net present value of the investment if the discount rate is 18%. Round your answer to nearest thousand dollars.

Solution

PV Factors:

Year 1 = 1 ÷ (1 + 18%)^1 ≈ 0.8475

Year 2 = 1 ÷ (1 + 18%)^2 ≈ 0.7182

Year 3 = 1 ÷ (1 + 18%)^3 ≈ 0.6086

Year 4 = 1 ÷ (1 + 18%)^4 ≈ 0.5158

The rest of the calculation is summarized below:

Year	1	2	3	4
Net Cash Inflow	$3,411	$4,070	$5,824	$2,065
Salvage Value				900
Total Cash Inflow	$3,411	$4,070	$5,824	$2,965
× Present Value Factor	0.8475	0.7182	0.6086	0.5158

Present Value of Cash Flows	$2,890.68	$2,923.01	$3,544.67	$1,529.31
Total PV of Cash Inflows	$10,888			
− Initial Investment	− 8,320			
Net Present Value	$2,568	thousand		

Example:

Assuming that our corporation **Xirr** chose to use a rate of 12%, let's calculate the net present value of the relevant cash amounts for Xirr's proposed purchase:

End of	Amount Paid for Machines	Net Cash Flows Before Discounting	Present Value Factors For $1 at **12%**	**Present Value $**
Today	(100,000)	(100,000)	1.00	(100,000)

Year 1		21,087	0.89	18,767
Year 2		24,847	0.80	19,878
Year 3		23,447	0.71	16,647
Year 4		22,717	0.64	14,539
Year 5		22,419	0.57	12,779
Year 6		23,186	0.51	11,825
Year 7		24,029	0.45	10,813
Year 8		23,551	0.40	9,420
Net Present Value				**$14,668**

The table shows the net cash amounts discounted by the specified rate of 12%. All of the cash amounts are assumed to occur at the end of the year.

When the net present value is a positive amount, the project is earning more than the rate used to discount the cash flows. As you can see from the above table, Xirr's proposed project is showing a positive net present value of $14,668. This means that the new machine will provide Xirr with $14,668 more in present value dollars than the minimum specified return of 12%.

A net present value of $0 would indicate that a project is expected to earn exactly the rate used to discount the future cash flows.

If the net present value is a negative amount, the project will earn less than the rate used to discount the cash flows. (This doesn't mean, however, that the project is showing a negative return—it could be the project is earning a return of 11% instead of the specified rate of 12%.)

Rationale for the NPV method

NPV = PV of inflows – Cost = Net gain in wealth

- If projects are independent, accept if the project NPV > 0.
- If projects are mutually exclusive, accept projects with the highest positive NPV, those that add the most value.
- In this example, would accept S if mutually exclusive (NPVs > NPVL), and would accept both if independent.

Internal Rate of Return (IRR)

This discounted cash flow model calculates the rate that will cause the net present value to equal zero. In other words, it answers the question, "What rate of return will the project earn over its life?" It is similar to the net present value method in that:

(a) all of the estimated cash flows over the entire life of the project are considered, and

(b) the estimated cash flows are discounted to the present.

Internal rate of return (IRR) is the discount rate at which the net present value of an investment becomes zero. In

other words, IRR is the discount rate which equates the present value of the future cash flows of an investment with the initial investment. It is one of the several measures used for investment appraisal.

IRR Calculation

The calculation of IRR is a bit complex than other capital budgeting techniques. We know that at IRR, Net Present Value (NPV) is zero, thus:

NPV = 0; or

PV of future cash flows − Initial Investment = 0; or

$$\left[\frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \ldots\right] - \text{Initial Investment} = 0$$

Where,

r is the internal rate of return;

CF_1 is the period one net cash inflow;

CF_2 is the period two net cash inflow,

CF_3 is the period three net cash inflow, and so on ...

But the problem is, we cannot isolate the variable **r** (=internal rate of return) on one side of the above equation. However, there are

alternative procedures which can be followed to find IRR. The simplest of them is described below:

1. Guess the value of r and calculate the NPV of the project at that value.
2. If NPV is close to zero then IRR is equal to r.
3. If NPV is greater than 0 then increase r and jump to step 5.
4. If NPV is smaller than 0 then decrease r and jump to step 5.
5. Recalculate NPV using the new value of r and go back to step 2.

Example

Find the IRR of an investment having initial cash outflow of $213,000. The cash inflows during the first, second, third and fourth years are expected to be $65,200, $96,000, $73,100 and $55,400 respectively.

Solution

Assume that r is 10%.

NPV at 10% discount rate = $18,372

Since NPV is greater than zero we have to increase discount rate, thus:

NPV at 13% discount rate = $4,521

But it is still greater than zero we have to further increase the

discount rate, thus NPV at 14% discount rate = $204
NPV at 15% discount rate = ($3,975)

Since NPV is close to zero at 14% value of r, therefore IRR ≈ 14%

We will save time by using a computer, financial calculator, or programmable calculator.

Hence:

- The IRR is the discount rate at which the NPV for a project equals zero. This rate means that the present value of the cash inflows for the project would equal the present value of its outflows. The following formula represent the IRR model:

$$0 = \sum_{t=0}^{n} \frac{CF_t}{(1 + IRR)^t}$$

- The IRR is the break-even discount rate.
- The IRR is found by trial and error.

As you can see below, Xirr finds that a rate of 16% will yield a net present value of $0:

End of	Amount Paid for Machines	Net Cash Flows Before Discounting	Present Value Factors For $1 at **16%**	**Present Value $**
Today	(100,000)	(100,000)	1.00	(100,000)
Year 1		21,087	0.86	18,135
Year 2		24,847	0.74	18,387
Year 3		23,447	0.64	15,006
Year 4		22,717	0.55	12,494
Year 5		22,419	0.48	10,761
Year 6		23,186	0.41	9,506
Year 7		24,029	0.35	8,410
Year 8		23,551	0.31	7,301
Net Present Value				**0**

The table shows the cash amounts discounted by the rate those results in net present value of $0. All of the cash amounts are assumed to occur at the end of each year.

Knowing that the project has an internal rate of return of

16% may be more useful to Xirr than knowing its net present value is $14,668. In fact, if this method is applied to all of its capital expenditure proposals, Xirr can easily rank the proposals according to profitability. For example, if Xirr decides to commit no more than $500,000 for non-emergency projects, it can start by funding those proposals which show the highest internal rate of return and work its way down the list until the entire $500,000 is committed.

A savvy company (or individual) will use the net present value method to help determine the amount it should spend to acquire another business. For example, assume that you wish to purchase WW Co. You expect that the WW Co. will generate positive net cash flows after tax of $15,000 per year for ten years, at which time you plan to liquidate or sell the company for $40,000 after taxes. To cover the risk associated with your investment in WW Co. you need to earn 14%. With that in mind, what is the maximum amount you should pay today for WW Co.?

The net present value method will give us the amount to be paid in order to earn 14%. The following table shows the required calculations:

	Net Cash Flows Before Discounting	Present Value Factors For **14%**	**Present Value $**
Today	0	1.00	$ 0
Year 1	15,000	0.88	13,200
Year 2	15,000	0.77	11,550
Year 3	15,000	0.67	10,050
Year 4	15,000	0.59	8,850
Year 5	15,000	0.52	7,800
Year 6	15,000	0.46	6,900
Year 7	15,000	0.40	6,000
Year 8	15,000	0.35	5,250
Year 9	15,000	0.31	4,650
Year 10	15,000	0.27	4,050
Year 10	40,000	0.27	10,080
Net Present Value			**$88,380**

If you purchase the WW Co. for $88,380 you will earn exactly a 14% return if the cash flows occur as estimated. If

you pay more than $88,380 you will earn less than a 14% return; a price of less than $88,380 means you will earn more than a 14% return.

To learn the rate that you will earn on a specific price, you can compute the internal rate of return. This is done by finding the rate that will discount the future cash amounts back to the price.

Rationale for the IRR method

If IRR > WACC or Cost of investment, the project's rate of return is greater than its costs. There is some return left over to boost stockholders' returns.

Decision Rule

A project should only be accepted if its IRR is NOT less than the target internal rate of return. When comparing two or more mutually exclusive projects, the project having highest value of IRR should be accepted.

IRR Acceptance Criteria

- If IRR > k, accept project.
- If IRR < k, reject project.
- If projects are independent, accept both projects, as both IRR > k
- If projects are mutually exclusive, accept S, because IRRs > IRRL.

Exercises

Use the following "present value of 1" factors for solving drills that require present value computations.

End of Year	6%	8%	10%	12%	16%
1	0.94	0.93	0.91	0.89	0.86
2	0.89	0.86	0.83	0.80	0.74
3	0.84	0.79	0.75	0.71	0.64
4	0.79	0.74	0.68	0.64	0.55
5	0.75	0.68	0.62	0.57	0.48

1. Which of the following models for evaluating capital expenditures considers the time value of money (discounts the future cash flows)?

a. Accounting Rate of Return

b. Internal Rate of Return

c. Payback

2. Which of the following models for evaluating capital expenditures does NOT consider the time value of money (does not discount the future cash flows)?

a. Accounting Rate of Return

b. Internal Rate of Return

c. Net Present Value

3. Which of the following models does NOT use cash flows?

a. Accounting Rate of Return

b. Internal Rate of Return

c. Payback

4. A company used the net present value method for evaluating a project. The project requires an immediate cash outlay of $450,000. The company discounted the cash flows by 16% and determined that the net present value of the project was a negative $300. From this information it is likely that the project

a. had an internal rate of return that was slightly GREATER than 16%

b. had an internal rate of return that was slightly LESS than 16%

c. had a negative internal rate of return

5. A company is contemplating an investment of $100,000 on January 1, 2007 that will return cash of $50,000 on December 31, 2007; $40,000 on December 31, 2008; and $60,000 on December 31, 2009. Using the present value of 1 factors for 16% (see above), the net present value of this investment is

($11,000) $11,000 $100,000 $111,000

6. A $100,000 investment will be made on January 1, 2011. The cash generated from this investment is expected to be received uniformly during each year. The yearly amounts are: $50,000 in year 2011; $40,000 in year 2012; $60,000 in year 2013. What is the expected payback period?

2.0 years 2.1 years 2.17 years 3 years

7. A project's cash flows are discounted by 16% and result is a positive net present value. The positive net present value indicates that the project

a. has an internal rate of return that is GREATER than 16%

b. has an internal rate of return that is LESS than 16%

c. has an internal rate of return that is EQUAL 16%

8. Depreciation Expense is a negative cash flow that needs to be discounted. True False

9. While depreciation does not result in a payment of cash, tax depreciation does reduce the cash payments for income taxes. True False

10. Depreciation Expense can be ignored when computing the accounting rate of return. True False

11. If the net present value of a project is $0, the project should be rejected. True False

12. A project whose future cash flows are discounted by 10% will have a larger net present value than the same cash flows discounted by 8%? True False

13. What amount would you invest today in return for a one-time $10,000 receipt one year from today, if you want to earn 8%? (Use the factors above.)

$9,200 $9,300 $9,920

14. How much would you invest today in return for $20,000 to be received two years from today, if you want to earn 10%? (Use the factors above.)

$16,000 $16,600 $18,260

15. A potential investment today will provide the following cash receipts

End of first year	$2,000
End of second year	0
End of third year	4,000

If you want to earn a 12% internal rate of return, how much would you invest today to receive these cash amounts? (Use the factors above.)

$4,260 $4,620 $4,980

16. If you invest $68,000 today and get repaid $100,000 at the end of five years, what is the internal rate of return on your investment? (Use the factors above.)

6% 8% 10% 12% 16%

17. If you invest $15,900 today and receive $10,000 at the end of one year plus $10,000 at the end of four years, what is the internal rate of return on your investment? (Use the factors above.)

6% 8% 10% 12% 16%

18. If you invest $15,300 today and receive $10,000 at the end of one year and $10,000 at the end of four years, what is the internal rate of return on your investment? (Use the factors above.)

6% 8% 10% 12% 16%

19. You invest $10,000 immediately plus an additional $100,000 at the end of one year. If the time value of money is 10%, what is the present value of your investment? (Use the factors above.)

$100,000 $101,000 $110,000

20. The state lottery offers a $500,000 prize consisting of $100,000 immediately and then four annual payments of $100,000 each. If the winner prefers to receive an immediate lump sum, the state discounts the future payments by 6%. What will be the immediate lump sum amount before any taxes? (Use the factors above.)

$346,000 $400,000 $446,000 $470,000

21. A firm intends to invest $1,000 in a project that generated net receipts of $800, $900 and $600 in the first, second and third years respectively. If the discount rate is 12% Should the firm go ahead with the project (use the NPV Model?

22. Find the IRR of this project for a firm with a 20% cost of capital:

YEAR	CASH FLOW
	$
0	-10,000
1	8,000
2	6,000

a) Try 20% b) Try 27% c) Try 29%

23. The estimated benefits from a project are expressed as cash flows instead of income flows because:

A. it is simpler to calculate cash flows than income flows.

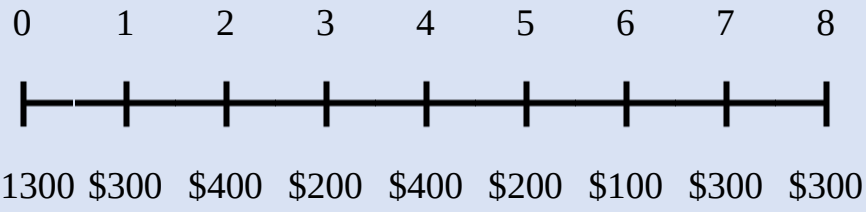
B. it is cash, not accounting income, that is central to the firm's capital budgeting decision.

C. this is required by the Internal Revenue Service.

D. this is required by the Securities and Exchange Commission.

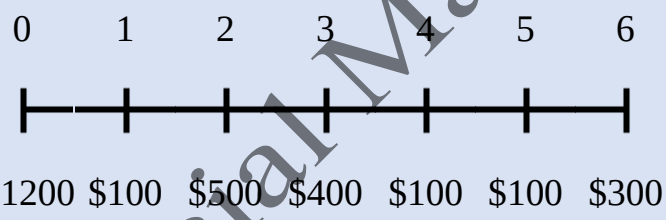
24. Choose the right answer:

1. Find the IRR of the project with the following cash flows.



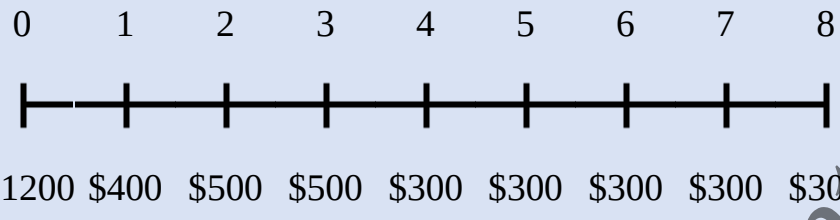
- a. 12.07%
- b. 14.42%
- c. 15.59%
- d. 20.33%

2. Find the IRR of the project with the following cash flows.



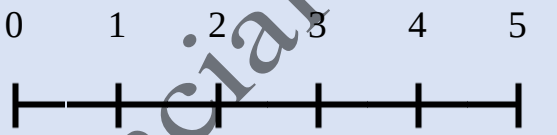
- a. -1.52%
- b. 2.75%
- c. 4.79%
- d. 7.12%

3. Find the NPV of the project with the following cash flows if the cost of capital is 14%.



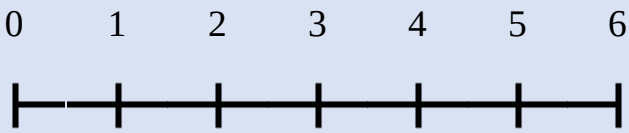
- a. $552.17
- b. $566.91
- c. $568.27
- d. $575.1

4. Find the Payback Period for the project with the following cash flows.



- a. 1.31 years
- b. 2.32 years
- c. 3.17 years
- d. 3.5 years

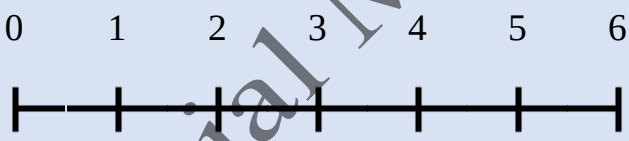
5. Find the NPV of the project with the following cash flows if the cost of capital is 16%.



$-1200 $500 $200 $200 $200 $300 $300

- a. $-117.94
- b. $-115.78
- c. $-111.14
- d. $-103.4

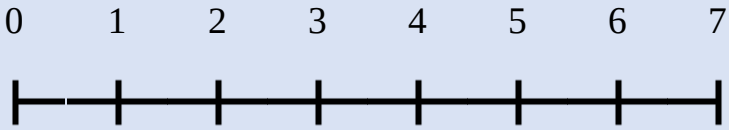
6. Find the IRR of the project with the following cash flows.



$-1400 $0 $100 $300 $300 $300 $500

- a. -0.49%
- b. 1.54%
- c. 3.66%
- d. 7.17%

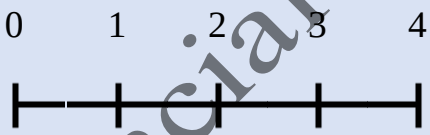
7. Find the NPV of the project with the following cash flows if the cost of capital is 14%.



$-1400 $100 $300 $300 $300 $300 $500 $500

- a. $-141.2
- b. $-131.71
- c. $-125.53
- d. $-117.9

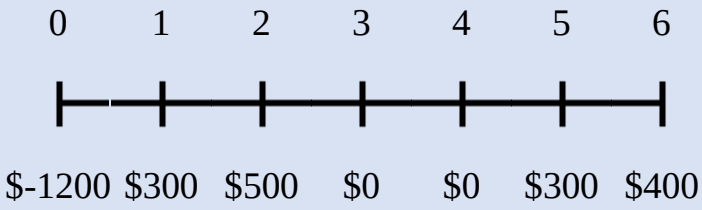
8. Find the Payback Period for the project with the following cash flows.



$-1300 $400 $200 $100 $700

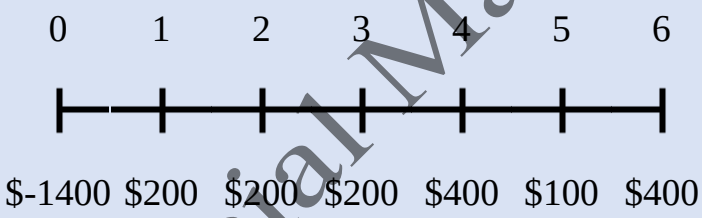
- a. 3.13 years
- b. 3.86 years
- c. 5.56 years
- d. 6.02 years

9. Find the IRR of the project with the following cash flows.



- a. 4.97%
- b. 6.93%
- c. 8.6%
- d. 11.48%

10. Find the IRR of the project with the following cash flows.



- a. -0.95%
- b. 1.85%
- c. 3.97%
- d. 6.14%

11. A capital investment is one that

A. has the prospect of long-term benefits.

B. has the prospect of short-term benefits.

C. is only undertaken by large corporations.

D. applies only to investment in fixed assets

12. LL Company is considering a project that calls for an initial cash outlay of $50,000. The expected net cash inflows from the project are $7,791 for each of 10 years. What is the IRR of the project? [(Hint: The cash flows from the project are an annuity so you can solve for i in the equation PVA = R(PVIFAi,10)

A. 6 percent

B. 7 percent

C. 8 percent

D. 9 percent

Sample test 1
Fourth year students
English Section

Question One: Identify true (a) or False (b) for each of the following statements.

No.	Statements
1	Insider trading occurs when someone has information that is not available to the public and then uses this information to profit from trading in a company's publicly traded securities.
2	The most important goal for financial management is to earn the highest profit for the firm.
3	The money markets are those markets dealing with long-term securities that have life more than one year.
4	While profits are important for the firm, the ultimate measure of performance is not what the firm gain, but how the earnings are valued by the investors.
5	Firms choose to operate at a high degree of operating leverage will have a low break-even level of operations
6	The axiom that current assets should be financed using current liabilities is subject to challenges if there is a substantial amount of permanent buildup in inventory that represents permanent current assets that do not generate cash and need to be financed.

7	Firms with good earnings and favorable financial trends will act well in a declining stock market over the short term.
8	The Financial manager cannot directly control the firms' stock but he can only act in a way constant with shareholders.

Question Two:

The following are the financial statements of Good-buy Company

Balance Sheet ($ in Millions)			
Assets	***2023***	**Liabilities and Owners' Equity**	***2023***
Current Assets		**Current Liabilities**	
Cash	400	**Accounts Payable**	200
Accounts Receivable	100	**Notes Payable**	100
Inventory	500	**Total Current Liabilities**	300
Total Current Assets	1000	**Long-Term Liabilities**	
		Long-Term Debt	800
Fixed Assets		**Total Long-Term Liabilities**	800
Property, Plant, and Equipment	1800	**Owners' Equity**	
Less Accumulated Depreciation	800	**Common Stock ($1 Par)**	500
Net Fixed Assets	1000	**Capital Surplus**	200
		Retained Earnings	200
		Total Owners' Equity	900
Total Assets	2000	**Total Liabilities and Owners' Equity**	2000

:

Income Statement ($ in Millions)	
	2023
Sales	2800
Cost of Goods Sold	2100
Administrative Expenses	100
Depreciation	526
Earnings Before Interest and Taxes	74
Interest Expense	30
Taxable Income	44
Taxes	19
Net Income	25
Dividends	3
Addition to Retained Earnings	22
Other Information	
Number of Shares Outstanding (Millions)	500
Price per Share	8.41

a. Calculate the following ratios:

1. Current Ratio

2. Quick Ratio
3. Receivables Turnover
4. Average collection period
5. Inventory Turnover
6. Fixed Assets Turnover
7. Total Assets Turnover
8. Times Interest Earned (TIE)
9. Debt Ratio
10. Profit Margin
11. Return on Assets (ROA)
12. Return on Equity (ROE)
13. Earnings Per Share (EPS)

b. Do you think that these ratios can help the company to analyze its performance in relationship to competitors? Why?

c. Discuss the problems in Using financial ratios?

Question Three

Alexandria, Inc. has $800,000 in current assets, $350,000 of which are considered permanent current assets. In addition, the firm has 600,000 invested in fixed assets.

a. Alexandria wishes to finance all fixed assets and half of its permanent current assets with long-term financing costing 10 percent. Short term financing currently costs 5 percent. Alexandria's earnings before interests and taxes are $200,000. Determine Alexandria earnings after taxes under this financing plan. The tax rate is 30 percent. (Use graphs to illustrate)

b. As an alternative, Alexandra might wish to finance all fixed assets and permanent current assets plus half of its temporary current assets with long-term financing. The same interest rates apply as in part a. Earnings before interest and taxes will be $200,000. What will be Alexandria's earning after taxes? The tax rate is 30%. (Use graphs to illustrate)

c. What are some of the risks and cost considerations associated with each of these alternative strategies?

Question 4:

An International Company produces toys that sell for $10 each and have a variable cost of $9.5 per unit. Fixed costs are $15,000.

a. Compute the break-even point in units.

b. What are the sales (in units) needed to earn a profit of $30,000.

c. The company intends to buy new equipment that will increase the fixed cost by $5000. Although the price will remain the same at $10, the increased automation will decrease the variable cost per unit to $8.5. Will the break-even point go up or down.

d. Use graphs to draw the two break even analysis before and after buying the new equipment and comment on them.

Sample test 2
Fourth year students
English Section

Question One: Choose the right answer:

1. Determine a firm's total asset turnover (TAT) if its net profit margin (NPM) is 5 percent, total assets are $8 million, and ROI is 8 percent.

A. 1.60

B. 2.05

C. 2.50

D. 4.00

2. Felton Farm Supplies, Inc., has an 8 percent return on total assets of $300,000 and a net profit margin of 5 percent. What are its sales?

A. $3,750,000

B. $480,000

C. $300,000

D. $1,500,000

3. Which of the following would NOT improve the current ratio?

A. Borrow short term to finance additional fixed assets.

B. Issue long-term debt to buy inventory.

C. Sell common stock to reduce current liabilities.

D. Sell fixed assets to reduce accounts payable.

4. The gross profit margin is unchanged, but the net profit margin declined over the same period. This could have happened if

A. cost of goods sold increased relative to sales.

B. sales increased relative to expenses.

C. the U.S. Congress increased the tax rate.

D. dividends were decreased.

5. Palo Alto Industries has a debt-to-equity ratio of 1.6 compared with the industry average of 1.4. This means that the company

A. will not experience any difficulty with its creditors.

B. has less liquidity than other firms in the industry.

C. will be viewed as having high creditworthiness.

D. has greater than average financial risk when compared to other firms in its industry.

6. Kanji Company had sales last year of $265 million, including cash sales of $25 million. If its average collection period was 36 days, its ending accounts receivable balance is closest to . (Assume a 365-day year.)

A. $26.1 million

B. $23.7 million

C. $7.4 million

D. $18.7 million

7. A company can improve (lower) its debt-to-total assets ratio by doing which of the following?

A. Borrow more.

B. Shift short-term to long-term debt.

C. Shift long-term to short-term debt.

D. Sell common stock.

8. Which of the following statements (in general) is correct?

A. A low receivables turnover is desirable.

B. The lower the total debt-to-equity ratio, the lower the financial risk for a firm.

C. An increase in net profit margin with no change in sales or assets means a poor ROI.

D. The higher the tax rate for a firm, the lower the interest coverage ratio.

9. Krisle and Kringle's debt-to-total assets (D/TA) ratio is .4. What is its debt-to-equity (D/E) ratio?

A. .2

B. .6

C. .667

D. .333

Question Two: Choose the right answer.

1. For a profitable firm, total sources of funds will always …….. total uses of funds.

A. be equal to

B. be greater than

C. be less than

D. have no consistent relationship to

2. Which of the following would be considered a use of funds?

A. a decrease in accounts receivable.

B. a decrease in cash.

C. an increase in account payable.

D. an increase in cash.

3. Which of the following is NOT a cash outflow for the firm?

A. depreciation.

B. dividends.

C. interest payments.

D. taxes.

4. Which of the following would be included in a cash budget?

A. depreciation charges.

B. dividends.

C. goodwill.

D. patent amortization.

5. Uses of funds include a (an):

A. decrease in cash.

B. increase in any liability.

C. increase in fixed assets.

D. tax refund.

6. On an accounting statement of cash flows an "increase(decrease) in cash and cash equivalents" appears as

A. a cash flow from operating activities.

B. a cash flow from investing activities.

C. a cash flow from financing activities.

D. none of the above.

7. which of the following would be considered a cash-flow item from an "investing" activity?

A. cash inflow from interest income.

B. cash inflow from dividend income.

C. cash outflow to acquire fixed assets.

D. all of the above.

8. According to the Financial Accounting Standards Board (FASB), which of the following is a cash flow from a "financing" activity?

A. cash outflow to the government for taxes.

B. cash outflow to shareholders as dividends.

C. cash outflow to lenders as interest.

D. cash outflow to purchase bonds issued by another company.

9. If the following are balance sheet changes:

$5,005 decrease in accounts receivable

$7,000 decrease in cash

$12,012 decrease in notes payable

$10,001 increase in accounts payable

a "use" of funds would be the:

A. $7,000 decrease in cash.

B. $5,005 decrease in accounts receivable.

C. $10,001 increase in accounts payable.

D. $12,012 decrease in notes payable.

Sample test 3

Fourth year students

English Section

Answer all of the following questions:

Question One: Chose the right answer from (a, b and c). Use a table to write down the number of question in one column and your choice in another one.

1) In the 30's firms:
   a) Had to concentrate on defensive aspect of survival preservation of liquidity and reconstruction.
   b) Had to merge and increase competition access to international markets
   c) Growth in technological innovations and creation of new industry resulted in further need of funds, prompting the study of finance to emphasize on liquidity and financing of the firm.

2) A limited liability company…
   a) is not attractive to family businesses
   b) cannot accumulate earnings
   c) has partnership-like flexibility in capital and management structure.

3) Which of the following is NOT a cash outflow for the firm?
   a) depreciation

b) dividends

c) interest payments

4) Rationale for the IRR method when evaluating projects is to accept the project when:

a) If IRR < WACC

b) If IRR = WACC

c) If IRR > WACC

5) Financial Structure:

a) Includes both short-term and long-term sources of financing

b) Includes short-term sources of financing

c) Includes long-term sources of financing

6) What factors influence a company's composite WACC?

a) The firm's capital structure and dividend policy.

b) The firm's investment policy.

c) All of the above.

Use this information to answer questions 8 through 12: Al-Amal Company produce and sell one of its products with sales value $ 34000 and quantity of 20000 units. The following are expenses information:

Selling & Administrative	$ 130,000
Interest Expense	$ 10,000
Variable Expenses	$ 7

7) What is the company's contribution margin?

a) $10 b) $13 c) $14
8) What is the break-even point in units?
a) 10,000 b) 14,000 c) 20,000
9) If the company wants to earn a profit of $42,000 instead of breaking even, what is the number of units the company must sell? a) 14,000 b) 18,200 c) 26,000
10) What is the increase of sales to face the increase of selling & administrative expenses with 10705.883? a) $18200 b) 18200 units c) $26000
11) The break even point units increases when: a) Fixed expenses increases b) Contribution margin increases c) Variable expenses and price Increase with the same ratio.
12) If the return on investment in company X and company Y is %20 and the net profit margin of company X is %4 and for

company Y is %10. What is the total asset turnover for each company in sequence?

a) 2.5 and 2 times

b) 0.2 and 0.5 time

c) 5 and 2 times

13) If the cost of beginning inventory of a company is $39000, the cost of ending inventory is $42000, and the annual sales are $2.4 millions. What is the inventory turn over if the gross profit margin of the company is %20?

a) 40 times

b) 47.4 times

c) 61.5 times

14) A company used the net present value method for evaluating a project. The project requires an immediate cash outlay of $450,000. The company discounted the cash flows by 16% and determined that the net present value of the project was a negative $300. From this information it is likely that the project.

a) had an internal rate of return that was slightly GREATER than 16%

b) had an internal rate of return that was slightly LESS than 16%

c) had a negative internal rate of return

15) a company is intended to invest $100000 in buying a machine on January 1, 2009. The cash generated from this investment is expected to be received uniformly during each year. The yearly amounts are: $50000 in year 2009; $40000 in year 2010; $60000 in year 2011. What is the expected payback period?

a) 2 years
b) 2.1 years
c) **2.17 years**

Question two: the following information of Al-zahra company based on 31 December 2020.

Total assets turnover	2.5 times
Inventory turnover	9 times
Collection period	18 days
Gross profit margin	% 10
Long term debt to Equity	5:10
Current ratio	2:1
Net profit after tax	%5
Dividends	%20

Balance Sheet of Al-zahra Company in 31 December 2023

Assets		Liabilities and Owners' Equity	
Cash	.....	Accounts payable	150000
Accounts	.....	Leases and taxes	50000
receivables	.....	payable	.....
Inventory	.....	Long term debt	250000
Fixed assets		Common stock	150000
		Retained earnings	
Total	.....	Total	.....

a) Use the above information to complete the balance sheet of the company

b) Suppose that the company uses its full capacity in production and need new expenditures, and it will keep the same dividend policy. Use the percentage of sales method to determine the financial needs of the company to maintain the growth of sales by 10% in 2008.

Question three: the following is the pro forma income statement for the first 6 months of Al-Eetehad Company.

Pro forma income statement June 2023

Sales revenue	$100,1000
Cost of goods sold	-61,470
Cross Profit	38,530
General and administrative expense	-12,000
Operating profit (EBIT)	**26,530**
Interest	-1,500
Earning before taxes	25,030
Taxes (20%)	-5,006
Earnings after Taxes (EAT)	**20,024**
Common stock dividends	1500
Increased In retained earnings	**$18,524**

The next table show anticipated sales of the company of total $100,000 over the first 6 months:

Monthly sales in Dollars

Jan.	Feb.	March	April	May	June
15,000	10,000	15,000	25,000	15,000	20,000

- Collection policies: 20% of sales is collected in the month of sales, 80% in the following month.
- Sales of December 2023 are $12,000.

- Average monthly cost of production are expected as follow:

Materials	$5,732	Labor	2,866	Overhead	1,854

- We assume all the costs are incurred on equal monthly basis. The company shall pay for materials one month after purchasing. Other payment will be based on direct monthly cash outlays, however dividends and interests will be paid at the end of June and taxes will be two equal payments in March and June. Purchased of materials in Dec. was $4,500. The company will purchase of $8,000 new equipment in Feb. and $10,000 in June.
- We assume that the company beginning cash balance is 5000 and it desires a minimum ending cash balance of $5000.

Prepare the Pro Forma Cash Budget of the company for the 6 months ending June 2020 and compute the borrowing and repayment provision of the company.

Question four: EGY3 Industries has 6.5 million shares of common stock outstanding with a market price of $14 per share. The company also has outstanding preferred stock with a market value of $10 million, and 25,000 bonds outstanding, each with a face value of $1,000 and selling at 90% of par value.

The bonds pay an annual coupon of 8% and have 10 years to maturity. The company dividends for common stock this year is $2

and expects a growth of 10% of dividends next year. Preferred stock is selling at a price of $20 per share and pays a dividend of $2 per share. The firm's tax rate is 40%. What is the firm's WACC?

Sample test 4

Fourth year students

English Section

Answer all questions

Question One: Choose the right answer from A) true and B) False. (10 marks)

1. The financial leverage affects the first half of the income statement, where it controls in determining earnings per share
2. Working capital is the difference between current assets and current liabilities.
3. The use of debt as a source of funding for the company achieves unique advantages because it encourages creditors to reduce the interest rate to encourage the company to borrow.
4. Working capital is the difference between current assets and current liabilities.
5. The use of financial ratios in financial analysis is a good way to evaluate the financial performance of the companies it takes into account the impact of inflation.
6. Break-even point is the point where revenues equal the total of all expenses including the cost of goods sold
7. Contribution margin is defined as sales (or revenues) minus variable expenses.

8. The break-even point in dollars of revenues is equal to the total of the fixed expenses divided by the contribution margin per unit.
9. The net income is reduced by depreciation expense so depreciation is referred as (a cash expense)
10. A decrease in Accounts Payable has a positive effect on cash

Question Two: (35 marks)

Zhang Corporation had net income of $100,000, paid income taxes of $30,000, and had interest expense of $8,000. What was Zhang's times interest earned ratio? Explain the importance of this ratio.
Selected information for 2024 for the Bernstein Company is as follows: Cost of goods sold $6,000,000 Average inventory $2,000,000 Net sales $8,000,000 Average receivables $3,000,000 Net income $1,000,000 The inventory turnover ratio of the company in 2023 was 2.00 Assuming a 360-day business year, what was the inventory turnover ratio for Bernstein in 2024? Comment.
Ames Corporation's net accounts receivable were $750,000 on December 31, 2023, and $1,250,000 on December 31, 2024. Net cash sales for 2024 were $3,300,000. The accounts receivable turnover ratio for 2024 was 16. What were the total net sales for 2024?
If the return on investment in the company A was 10% and 12% of the

company's B, and the ratio of profit margin in the company's A 5% and the company's B 4%, calculate the asset turnover rate in each of the two companies, compared and comment.

Which of the following activities would generally be regarded as a financing activity in preparing a statement of cash flows? Why?

a. Dividend distribution. b. Proceeds from the sale of stocks of other firms.

c. Loans made by the entity to other businesses. d. Employees' salaries and wages paid

Question Three: (25 marks)

XY Co is considering a bid for XY Co. Both companies are stock-market listed and are in the same business sector. Financial information on XY Co, which is shortly to pay its annual dividend, is as follows:

Number of ordinary shares 5 million

Net profit $2000000

Ordinary share price $3·30

Proposed dividends (payout ratio) 60%

Other relevant financial information

Average sector price/earnings ratio 10

Required:

1. Calculate the value of Danoca Co. using the price/earnings ratio.
2. Calculate Dividend Policy Ratios of Danoca and comment on them.

Question Four: (30 marks)

Alfa co. produces and sells 100,000 units for the price of LE 4 per/unit of the product A23. This quantity represents 50% of its production capacity and gain LE 20000 profit. If the unit variable cost of production is LE 2.

Required:

1. Count the break-even point of the company.
2. Count the profit if the company produce and sell all products based on full capacity.
3. If the company wants to develop the production system and this will increase the fixed cost by 50% and reduce the variable cost by 25%. What is the new break-even point?
4. If the company want to keep the production to the old break-even point counted in (required 1) what is the sale price.
5. How would the company reduce the break-even point?

End of Questions

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