Department of Finance,
Risk Management and Banking
School of Management Sciences

Finance for non-financial managers

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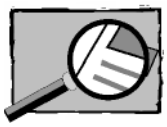
INTRODUCTION

This module, Finance for Non-financial Managers, explains the financial goal of a firm and illustrates how the principles of finance should be applied in creating wealth. It assumes that students have no prior knowledge of compiling, analysing and interpreting financial statements. In this module, we will attempt to give you the fundamental principles of finance with clear emphasis on the long-term goal of creating value, followed by the short-term goals of profitability, liquidity and solvency.

ICONS USED IN THIS STUDY GUIDE

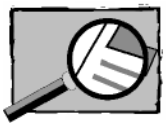
	**Learning outcomes.** The learning outcomes indicate what aspects of the particular topic or study unit you will have to master (i.e., know and understand).
	**Key concepts.** Your attention is drawn to certain keywords or concepts that you will come across in the topic or study unit.
	**Overview.** The overview provides the background to a particular topic or study unit.
	**Activity.** These self-assessment activities should be performed in order to develop a deeper understanding of the learning material.
	**Feedback.** Feedback is provided on the self-assessment activities.
	**Read.** This icon will direct you to read certain sections of the prescribed book for background information.
	**Study.** The "study" icon indicates which sections of the prescribed book you will need to study (i.e., learn, understand and practise).

	**Assessment.** When you see the "assessment" icon, you will be required to test your knowledge, understanding, and application of the material you have just studied.
	**Summary.** This icon introduces a brief summary of what was covered in a particular study unit and what can be expected in the following study unit(s).
	**Check list.** After completion of a particular study unit, you should confirm that you have in fact achieved all learning outcomes and that you comply with the assessment criteria.

Study unit 1

The financial goal of a firm

Contents



Overview

This study unit introduces you to the field of finance and explores career opportunities in both financial services and managerial finances. The forms of business organisation, the financial goal of the firm and the role of management in achieving the goal will be explained. The study unit concludes by looking at the agency problem, and the conflict that exists between managers and owners in a large company.

Study in the prescribed book

Study chapter 1 entitled "The financial goal of a firm" in your prescribed book.

Learning outcomes

Once you have worked through this study unit, you should be able to

- define profitability in a company
- distinguish between liquidity and solvency
- distinguish between profit maximisation and wealth maximisation
- know why companies prefer wealth maximisation to profit maximisation
- know what is the difference between financial management and accounting
- know what are the functions of the financial manager
- know what are the fundamental principles of financial management
- describe the agency problem

1.1 THE FINANCIAL GOAL OF A FIRM

Read section 1.3 of the prescribed book.

The goal of the firm is to maximise shareholders' wealth and not maximise profit. Profit maximisation is not consistent with wealth maximisation, because of

- the timing of earnings per share
- earnings that do not represent cash flows available to shareholders
- a failure to consider risk

1.2 FINANCIAL MANAGEMENT AND ACCOUNTING[1]

Read section 1.4 of the prescribed book

Many people regard financial management and accounting in the business environment as the same thing; however, there is a difference. Handling of funds and decision making are the two reasons why financial management and accounting are considered different fields.

1.2.1 Handling of funds

The primary functions of an accountant are to develop and provide data for measuring the performance of the firm, to assess its financial position and to see to the payment of taxes. The financial manager's role differs in the way in which he/she views the funds of the firm.

1.2.2 Decision making

The accountant devotes the majority of his/her attention to the collection and presentation of historical financial data, whereas the financial manager evaluates the accountant's financial statements, processes and additional data, and makes decisions based on subsequent analyses.

1.3 THE FUNDAMENTAL PRINCIPLES OF FINANCIAL MANAGEMENT

Financial management is based on the following principles:

- the cost-benefit principle

1 Read section 1.4 of the prescribed book

- the risk-return principle
- the time value of money

Read sections 1.7 and 1.8 of the prescribed book.

Assessment

(1) The financial goal of the firm is to …

1 maximise return.
2 optimise solvency.
3 increase the value of the firm.
4 optimise liquidity.

(2) Financial management is based on the following principles, except for …

1 the time value of money.
2 risk-returns.
3 annuities.
4 cost benefit.

(3) The primary goal of a public company interested in serving its shareholders should be to …

1 minimise the debt use by the firm.
2 maximise expected earnings per share.
3 minimise the chance of losses.
4 maximise the share price.

(4) The goal of profit maximisation would result in a priority for …

1 cash flows available to stockholders.
2 risk of the investment.
3 earnings per share.
4 timing of the returns.

(5) Money markets are markets for …

1 foreign currency exchange.
2 company shares.
3 long-term bonds.
4 short- term debt securities.

(6) Agency costs include all of the following, EXCEPT for …

1 management reports to stockholders.
2 performance incentives paid to managers.
3 the cost of monitoring management behaviour.
4 purchasing insurance against management misconduct.

(7) _____ is/are concerned with the duties of the financial manager in the business firm.

1 Financial services
2 The financial manager
3 Managerial finance
4 None of the above

(8) Finance can be defined as …

1 the system of debits and credits.
2 the science of the production, distribution and consumption of wealth.
3 the art and science of managing money.
4 the art of merchandising products and services.

(9) The part of finance concerned with the design and delivery of financial products and advice to individuals, business and government is called …

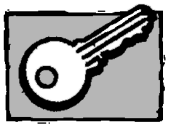
1 managerial finance.
2 the financial manager.
3 financial services.
4 none of the above.

(10) If a company's managers are NOT owners of the company, they are …

1 dealers.
2 agents.
3 outsiders.
4 brokers.

Feedback

Question 1	*Answer 3*
Question 2	*Answer 3*
Question 3	*Answer 4*
Question 4	*Answer 3*
Question 5	*Answer 4*
Question 6	*Answer 1*
Question 7	*Answer 3*
Question 8	*Answer 3*
Question 9	*Answer 3*
Question 10	*Answer 2*



Key concepts

Accounting: the system of recording and verifying of, and reporting on the value of assets, liabilities, income and expenses in the books of accounts.

Agency problem: the cost incurred by the owners of a business when using an agent (management); associated with problems such as the disparity between management and shareholder's objectives.

Capital market: a marketplace where companies and governments can raise long-term funds; a market in which money is lent for periods of longer than a year.

Cost-benefit principle: sound financial decision making requires that an analysis of the total cost and the total benefits be conducted – as far as possible, the benefits should be greater than the cost of any decision.

Financial institution: an organisation that acts as a channel between savers and borrowers of funds (Two main types of financial institutions are banks that pay interest on deposits from the interest earned on the loans, and insurance companies and mutual funds that collect funds by selling their policies or shares to the public and provide returns in the form of periodic benefits and profit payouts.)

Financial manager: uses financial statements to make capital-budgeting decisions, capital structure decisions and working-capital decisions in order to create wealth for the organisation's shareholders.

Money markets: the financial markets for short-term borrowing and lending; provide short-term liquidity with securities such as treasury bills, commercial paper and bankers' acceptances.

Profitability: the firm's ability to generate revenues that will exceed total costs by using the firm's assets for productive purposes; may be achieved by marketing products or services to maintain a sufficient profit margin with the support of promotions at competitive prices directed to appropriate target markets through appropriate distribution channels.

Spread: the difference between the rate charged and the rate paid (Financial institutions need to invest or lend out their available funds at a rate that exceeds the rate they are paying to their depositors.)

Solvency: the extent to which a firm's assets exceed its liabilities; differs from liquidity in that liquidity pertains to the settlement of short-term liabilities, while solvency pertains to the excess of total assets over total liabilities.

Time value of money: a concept used to evaluate any financial decision involving differences in the timing of cash inflows and outflows; a matter of interest that may be earned if money is available today and invested, or of opportunity cost if an amount will only be received at some future date – an amount of money today is worth more than it will be at some point in the future.

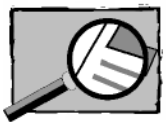
Summary

In this introductory study unit, we presented an overview of financial concepts and the key activities of the non-financial manager. In the next study unit, we will discuss the understanding of financial statements.

Study unit 2

Understanding financial statements

Contents



Overview

As you already know, financial statements can be used to analyse the financial performance and position of any business ranging from large businesses (for example, Eskom, Sanlam and Telkom) to small businesses (spaza shops). The most important financial statements are the statement of financial performance, the statement of financial position and the cash flow statement. In this study unit, we will look at the various users of financial statements, followed by a discussion of the GAAP. A description of the classification of financial information will be followed by a look at the recording of changes in the financial position.

We will also consider the three important financial statements in detail and conclude the study unit with the auditor's report and the director's report.

Study in the prescribed book

Study chapter 2 entitled "Understanding financial statements" in your prescribed book.

Learning outcomes

Once you have worked through this study unit, you should be able to

- explain why financial statements are important to a firm
- understand how accountants apply the generally accepted accounting principles (GAAP)
- classify financial information and the accounts used for capturing financial information
- apply the rules of debit and credit
- correctly interpret a statement of comprehensive income

- correctly interpret a statement of financial position
- correctly interpret a cash flow statement

2.1 KEY GENERALLY ACCEPTED ACCOUNTING PRINCIPLES (GAAP)

Read section 2.3 of the prescribed book.

The financial statements must be generated according to generally accepted accounting principles (GAAP) to be reliable, understandable and relatively consistent between reporting periods.

2.2 CLASSIFICATION OF FINANCIAL INFORMATION

Read section 2.4 of the prescribed book.

A logical classification of the vast amount of financial information generated in a firm requires a system of accounts. The accountant may use either a computerised system (for example, AccPac, Pastel, Baan or SAP) or a manual system.

Regardless of the system used, it must provide for five types of accounts, namely:

- assets account
- liabilities account
- owners' equity account
- revenue account
- expense account

The statement of financial position and cash flow statement are used to determine the firm's liquidity and solvency for the purpose of the asset, liability and owners' equity accounts. The statement of comprehensive income is used to determine the firm's profitability for the purpose of the income/revenue and expense accounts.

2.3 SUMMARY OF FINANCIAL INFORMATION IN THE FINACIAL STATEMENTS

Read section 2.6 of the prescribed book.

The statement of comprehensive income, the statement of financial position and the cash flow statement are three typical financial statements.

2.3.1 The statement of comprehensive income

The statement of management provides a financial summary of the firm's financial performance during a certain period by comparing revenue to expenses. The "accounting period" refers to the period covered by an statement of financial performance, which can be a month, a quarter of a year, half a year, or a year. Not all transactions can be so precisely divided by accounting periods. The purchase of a building, fire-fighting equipment, vehicles, alarm systems, and so forth, provide benefits to the business over all the years in which such assets are used.

Table 2.2 (p 28) of the prescribed book provides an example of a statement of comprehensive income. A statement of comprehensive income usually begins with sales. The details involved in computing the cost of goods sold are also often omitted and only summary figures are provided for operating expenses, as can be seen in the example in table 2.2.

2.3.2 The statement of financial position

The purpose of the statement of financial position is to show the financial position of a firm at a given time. The statement of financial position consists of a listing of the assets, shareholders' interest and liabilities of a business. There is a difference between fixed assets and current assets. Fixed assets are assets that will be retained for a longer period, which is usually more than a year; it includes land and buildings, plant and equipment, and motor vehicles.

Current assets are those that change with the transactions that take place as business is conducted. It includes inventory (stock), accounts receivable (debtors) and cash deposited or on hand.

Owners' equity represents the resources invested by the owners and is equal to the total assets minus the liabilities. Liabilities are debts, which can generally be divided into two basic categories: long-term debt in the form of loans with a maturity exceeding one year; and current liabilities, which are debts with a maturity of less than a year.

Table 2.4 in your prescribed book provide you with an example of a statement of financial position.

2.3.3 The cash flow statement

The cash flow statement focuses on the cash receipts and payments between two consecutive years. The three objectives of the cash flow statement are to provide information regarding cash utilised or generated by

- operating activities, which include all transactions and other events that are not investing or financing activities
- investing activities, which include transactions involving the acquisition or disposal of fixed assets and investments, including advances (loans) not described as cash
- financing activities, which include the cash effects (inflow and outflow) of transactions and other events involving long-term creditors and owners

Read sections 2.6.3 of the prescribed book.

Assessment

(1) The equity of a company consists of …

1 cash, accounts receivable and inventory.
2 ordinary shares, retained earnings and reserves.
3 debentures, ordinary share capital and retained earnings.
4 retained earnings and long-term debt.
5 debentures and preference shares.

(2) Which one of the following statements is correct?

1 A profitability ratio of 15% is traditionally regarded as the norm for all firms.
2 A liquidity ratio of 12 times per annum is regarded as the norm for all firms.
3 Financial ratios do not have to be compared to a standard to isolate any deviations from the norm.
4 An acid-test ratio of 1 is traditionally regarded as the norm.

(3) A firm's cash flows become more predictable as the …

1 current ratios increase.
2 return on owners' equity increases.
3 current liabilities decrease.
4 current assets decrease.

(4) Yebo Ltd is a spaza shop in Guguletu. The following information for Yebo Ltd is available:

	R
Sales	*300 000*
Earnings after interest and tax	*150 000*
Preference dividends due	*20 000*
Preference shares issued	*5 000*
Ordinary shares issued	*13 000*

Calculate the earnings per share (EPS) for Yebo Ltd

1 R10
2 R26
3 R30
4 R6

(5) Accounting practices and procedures used to prepare financial statements are called …

1 SEC.
2 FASB.
3 GAAP.
4 IRB.

(6) Total assets less net fixed assets equals …

1 gross assets.
2 current assets.

3 depreciation.
4 liabilities and equity.

(7) Net profits after taxes are defined as …

1 gross profits minus operating expenses.
2 sales revenue minus cost of goods sold.
3 EBIT minus interest.
4 EBIT minus interest and taxes.

(8) On the statement of financial position, net fixed assets represent …

(a) gross fixed assets at cost minus depreciation expense.
(b) gross fixed assets at market value minus depreciation expense.
(c) gross fixed assets at cost minus accumulated depreciation.
(d) gross fixed assets at market value minus accumulated depreciation.

(9) The net value of fixed assets is also called its …

1 market value.
2 par value.
3 book value.
4 price.

(10) Pumla Ltd had the following accounts and financial data for 2016:

Sales revenue	*R*	*Cost of goods sold*	*R*
	3,060		*1,800*
Accounts receivable	*500*	*Preferred stock dividends*	*18*
Interest expense	*126*	*Tax rate*	*40%*
Total operating expenses	*600*	*Number of common shares outstanding*	*1,000*
Accounts payable	*240*		

The firm's net profit after taxes for 2016 was …

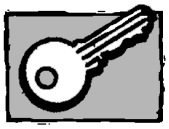
1 –R206
2 R213
3 R320
4 R206

Feedback

Question 1 *Answer 2*
Question 2 *Answer 4*
Question 3 *Answer 4*
Question 4 *Answer 1*

The firm's EPS = net profit/number of shares
= 130 000/13 000
= R10

Question 5	*Answer 3*
Question 6	*Answer 2*
Question 7	*Answer 4*
Question 8	*Answer 3*
Question 9	*Answer 3*
Question 10	*Answer 3*



Key concepts

Accounts payable: an account due for payment that, in contrast to a note payable, does not involve the issuing of a formal written promise to the creditor (the two types of liabilities are shown separately in the statement of financial position)

Auditor's report: a statement that the auditors have audited the annual financial statements and that these statements fairly represent the financial position of the firm at the financial year-end date, as well as the results of the firm's operations for the year under review and its cash flow information

Statement of financial position: part of the financial statements of a firm; indicates the firm's financial position at a specific point in time, that is, what the assets of the firm are worth (at book value) and how they were financed by means of equity and debt financing

Cash flow statement: part of the financial statements of a firm; indicates what cash flows were generated from operating activities, from financing activities and from investment activities

Current assets: those assets that change with the transactions that take place as business is conducted – inventory (stock), accounts receivable (debtors) and cash deposited or on hand (In a trading business, inventory would be merchandise for resale; a manufacturing firm would hold an inventory of raw material, work-in-process and finished goods.)

Director's report: an overview of the firm and its state of affairs for the benefit of the users of the financial statements; deals with the firm's nature of business (including the mission statement, the influence of the state of the economy, and prevailing conditions in the industry), profit or loss, and state of affairs; contains information on additional financing raised, any major changes in the nature of the firm's fixed assets, and dividends declared and/or paid

Fixed assets (non-current assets): assets that will be retained for a longer period than the accounting period of the business, which is usually a year; include land and buildings, plant and equipment, and motor vehicles

GAAP: generally accepted accounting practices

Statement of comprehensive income: part of the financial statements of a firm; measures the financial performance during a certain period; that is, whether a profit or a loss was recorded; also referred to as the earnings statement of operations, and profit and loss statement

Liabilities: debts, which can generally be divided into two basic categories: long-term debt in the form of loans with a maturity exceeding one year; and current liabilities, which are debts with a maturity of less than a year

Owners' equity: the resources invested by the owners; equal to the total assets minus the liabilities

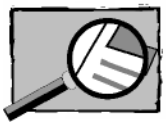
Summary

In this study unit, we considered the GAAP principles, followed by the classification of financial information and finally, how financial information is summarised in the three most important financial statements. The next study unit deals with the analysis of financial statements.

Study unit 3

Analysis of financial statements

Contents



Overview

The purpose of financial analysis is to evaluate the financial performance and the financial position of the company. Such an analysis can indicate whether the company is profitable and financially sound, and is achieving its goals.

Study in the prescribed book

Study chapter 3 entitled "The analysis of financial statements" in your prescribed book.

Learning outcomes

Once you have worked through this study unit, you should be able to

- explain why we conduct financial statement analysis
- distinguish between industry comparative analysis and time-series analysis
- understand the five basic financial ratios and draw conclusions
- calculate and interpret profitability ratios
- calculate and interpret liquidity ratios
- calculate and interpret activity ratios
- calculate debt (solvency) ratios
- calculate and interpret securities market ratios

3.1 TYPES OF COMPARISONS

Two types of comparisons can be made, namely, an industry comparative analysis and a time-series analysis. **Industry comparative analysis** involves the comparison of the financial ratios of different firms at the same point in time. This is also called a "benchmarking approach" because the firm's performance can be compared either to that of the industry leader or to industry averages.

Time-series analysis is conducted when a financial analyst evaluates the performance of a firm over time. The most informative approach to ratio analysis is one that combines industry comparative and time-series analyses.

3.2 BASIC FINANCIAL RATIOS

Financial ratios can be divided into the following five basic groups:

3.2.1 Profitability ratios

As a group, profitability measures allow the analyst to evaluate the effectiveness and efficiency of the firm's management and employees in generating profit by means of sales, and the productive use of assets and of the capital of the owners.

Typical measurements of profitability are the following:

- gross profit margin
- net profit margin
- return on investment (ROI)
- return on equity (ROE) or return on net assets (RONA)

3.2.2 Liquidity ratios

A firm has liquidity when it is able to satisfy its short-term obligations as they become due.

Liquidity can be measured by the following:

- net working capital
- current ratio
- quick (acid-test) ratio

3.2.3 Activity ratios

Activity ratios are used to measure the speed at which various accounts are converted into sales or cash. The most important current accounts that can measure the activity ratio include inventory, accounts receivable and accounts payable.

Tables 3.1 and 3.2 of the prescribed book provide examples on how to calculate inventory turnover.

3.2.4 Debt (solvency) ratios

The debt position of a firm indicates how much money of other people is being used in the attempt to generate profits; it therefore gives an indication of the solvency of the firm. In general, the greater the extent to which a firm uses debt, the greater its financial leverage.

Financial leverage is a term used to describe the magnification of risk and return using fixed-cost financing, such as debt and preference shares. Debt ratio and debt-equity ratio are two of the most commonly used measures.

3.2.5 Security market ratios

Earnings per share (EPS), dividend per share (DPS), dividend yield (DY) and price-earnings ratio (P/E ratio) are only applicable to companies listed on a securities exchange such as the JSE Limited.

Assessment

Use the following information to answer questions 1 to 4.

Bailey Property Ltd is a real-estate company that sells and buys property. Bailey Property Ltd has the following balances in its financial statements for the past financial year:

	R
Sales	*3 600 000*
Cost of goods sold	*600 000*
Gross profit	*3 000 000*
Net profit	*1 621 750*
Inventory	*200 000*
Accounts receivable	*250 000*
Cash	*100 000*
Net fixed assets	*1 200 000*
Total assets	*10 450 000*
Owner's equity	*8 200 000*
Long-term debt	*1 100 000*
Accounts payable	*250 000*
Dividends paid to ordinary shareholders	*486 525*
Number of ordinary shareholders	*8 000 000*
Current share price	*250 cents*

(1) The firm's gross profit margin is equal to …

1 33,33%.
2 53,33%.
3 63,33%.
4 83,33%.

(2) The firm's current ratio is equal to …

1 1,4.
2 2,2.
3 2,6.
4 2,8.

(3) The firm's return on equity (ROE) is equal to …

1 10, 77%.
2 12,77%.
3 15,77%.
4 19,77%.

(4) The firm's earnings per share (EPS) is closest to …

1 2 cents.
2 6 cents.
3 20 cents.
4 36 cents.

(5) Bailey Property Ltd has a current ratio of 1 in order to improve its liquidity ratios, this firm might …

1 improve its collection practices, thereby increasing cash and increasing its current and quick ratios.
2 improve its collection practices and pay accounts payable, thereby decreasing current liabilities and increasing the current and quick ratios.
3 decrease current liabilities by utilising more long-term debt, thereby increasing the current and quick ratios.
4 increase inventory, thereby increasing current assets and the current and quick ratios.

(6) As a firm's cash flows become more predictable, …

1 the current ratio will expand.
2 the return on equity will increase.
3 current liabilities will decrease.
4 current assets will decrease.

(7) The _____ is useful in evaluating credit and collection policies.

1 average payment period
2 current ratio
3 average collection period
4 current asset turnover

(8) A firm with a total asset turnover that is lower than industry standard but with a current ratio that meets industry standards must have excessive …

1 fixed assets.
2 inventory.
3 accounts receivable.
4 debt.

(9) The following groups of ratios provide the information critical to the short-term operation of the firm:

1 liquidity, activity, and profitability
2 liquidity, activity, and common stock
3 liquidity, activity, and debt
4 activity, debt, and profitability

(10) A decrease in total asset turnover will result in _____ in the return on equity.

1 *an increase*
2 *a decrease*
3 *no change*
4 *an undetermined change*

Feedback

Question 1	*Answer 4*	
	The firm's gross profit margin	*= gross profit/sales*
		= 3 000 000/3 600 000
		= 83,33%
Question 2	*Answer 2*	
	The firm's current ratio	*= current assets/current liabilities*
		= 550 000/250 000
		= 2,2
Question 3	*Answer 4*	
	The firm's ROE	*= net profit/owner's equity*
		= 1 621 750/8 200 000
		= 19,77%
Question 4	*Answer 3*	
	The firm's EPS	*= net profit/number of shares*
		= 1 621 750/8 000 000
		= 20 cents
Question 5	*Answer 3*	
Question 6	*Answer 4*	
Question 7	*Answer 3*	
Question 8	*Answer 1*	
Question 9	*Answer 1*	
Question 10	*Answer 2*	

Key concepts

Activity ratios: measure the speed at which various accounts are converted into sales or cash inflows or outflows

Average collection period (ACP): a useful means for evaluating credit and collection policies; determined by dividing the average daily credit sales into the accounts receivable balance

Average payment period (APP): the period that lapses between buying the products and actual payment when firms buy inventory on credit from producers or suppliers; determined by dividing the average daily credit purchases into the accounts payable balance

Benchmarking: a type of cross-sectional analysis in which the firm's ratio values are compared to those of a key competitor or group of competitors, which the firm wishes to evaluate

Current ratio: one of the most commonly cited financial ratios (used to measure liquidity) expressed as current assets divided by current liabilities

Debt-equity ratio: an indicator of the relationship between the long-term funds provided by creditors and those provided by the firm's owners; commonly used to measure the degree of financial leverage of the firm; defined as long-term debt divided by shareholders' equity, times 100 over 1

Debt ratio: measurement of the proportion of total assets provided by the firm's creditors – the higher this ratio, the greater the amount of other people's money being used in the attempt to generate profits; the formula for calculation is total liabilities divided by total assets, times 100 over 1

Dividend per share (DPS): share earnings calculated as dividends for ordinary shareholders, divided by number of ordinary shares issued

Dividend yield: calculated as dividends per share, divided by current market price, times 100 over 1; the earnings per share is not all paid out to shareholders, but rather the dividends per share is the actual cash flow shareholders receive

Earnings per share (EPS): measurement of the return earned on behalf of each ordinary share issued; monitored by investment analysts and portfolio managers; calculated as earnings after tax less preference dividends, divided by the number of ordinary shares issued
Earnings yield: an indicator of the current income-producing power per ordinary share at the current market price

Gross profit margin: the indicator of the contribution from the firm's core business towards covering the firm's operating expenses

Industry comparative analysis: the comparison of the financial ratios of different firms in the same industry at the same point in time

Inventory turnover: a measurement of cost of goods sold divided by average inventory; average inventory is beginning inventory plus ending inventory, divided by 2 (The activity, or liquidity, of a firm's inventory is commonly measured by its turnover.)

Liquidity ratio: measurement of a firm's ability to satisfy its short-term obligations as they become due

Net profit margin: the measurement of the percentage of each sale rand remaining after all expenses, including taxes, have been deducted; a commonly cited measure of the firm's success with respect to earning on sales

Net working capital: the amount by which a firm's current assets exceed its current liabilities; can be positive or negative

Price earnings ratio (PE): current market price per ordinary share, divided by earnings per share (the opposite of the earnings yield); investors can multiply the P/E by the EPS to find a rough approximation of the value of an ordinary share

Profitability ratios: measures of profitability relating the returns of the firm to its sales, its assets or its equity, to enable the analyst to evaluate the effectiveness and efficiency of the firm's management and employees in generating profit by means of sales, the productive use of assets and the productive use of the capital of the owners – typical

measures are gross profit margin, net profit margin, return on investment (ROI), and return on equity (ROE) or return on net assets (RONA)

Quick (acid-test) ratio: used to measure liquidity, it is similar to the current ratio except that it excludes inventory (as the least liquid current asset) from current assets; calculated as current assets less inventory, divided by current liabilities

Ratio analysis (financial analysis): the application of a formula to financial data in order to calculate a given ratio and, more importantly, to interpret the ratio

Return on equity (ROE): a measure of the return earned on the owners' investment; determined by three variables, namely, profitability (the net profit margin), activity (asset turnover) and leverage (also called gearing)

Return on investment (ROI): a measure of the overall effectiveness of management in generating profits using the firm's available assets; sometimes also called return on assets or ROA

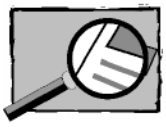
Summary

In this study unit, we looked at the two different types of ratio analysis, namely industry comparative analysis and time-series analysis. We concluded the study unit with a discussion of the financial ratios. The next study unit deals with profit planning and control.

Study unit 4

Profit planning and control

Contents



Overview

In this study unit, we will see the importance of profit planning and control in a firm. Profit planning and control are short-term aspects of financial management and are undertaken in most business organisations by means of budgets.

Study in the prescribed book

Study chapter 4 entitled "Profit planning and control" in your prescribed book.

Learning outcomes

Once you have worked through this study unit, you should be able to

- correctly identify the cost components of a firm
- classify cost as fixed or variable
- accurately calculate and interpret the breakeven point and margin of safety ratio of a firm
- accurately calculate the mark-up percentage in order to achieve a certain gross profit
- identify the role of the budgeting process
- distinguish between types of budgets
- apply the principles of budgeting
- compile a budgeted statement of comprehensive income and statement of financial position sheet

4.1 COST CONCEPTS

Cost may be regarded as sacrifices made to acquire goods/services.

The classification of cost depends on different types of firms, as listed below:

- retailing firms
- service firms
- manufacturing firms

4.2 UNDERSTANDING COST BEHAVIOUR

Costs may be classified as fixed, variable or semi-variable costs. Fixed costs are costs that remain constant during a given period for a given potential capacity, irrespective of the degree to which the capacity is utilised during the period. Variable costs change with fluctuations in the number of units produced and sold. Semi-variable costs consist of fixed and variable cost elements and therefore, do not vary in direct proportion to changes in production volume.

4.3 BREAKEVEN ANALYSIS

The breakeven point is where total revenue equals total cost, in other words, no profit or loss is made.

Breakeven analysis provides a framework for understanding the interrelationships between

- variable costs
- fixed costs
- sales volume
- selling prices

Figure 4.3 in your prescribed book gives a graphic illustration of the breakeven point. The area between total fixed cost and total cost represents the variable cost. At the breakeven point, no profit or loss will be made. The firm will earn a profit above the breakeven point, and will suffer a loss if sales are below the breakeven point.

4.4 THE BUDGETING PROCESS

The budgeting process starts with an estimate of expected sales during the period for which the planning is done. Expected sales are influenced by variables that are beyond the control of the firm, such as the expected growth in GDP, interest rates, inflation and exchange rates.

An integrated budgeting system consists of following two main types of budgets:

- operating budgets
- financial budgets

4.5 RESPONSIBILITY CENTRES

Study

Study section 4.6 entitled "Responsibility centres" in chapter 4 of your prescribed book.

4.6 PRINCIPLES OF BUDGETING

Managers who draw up a budget must accept responsibility for it. The financial manager and the finance department serve in an advisory capacity.

The following are some of the principles of budgeting that may contribute to meaningful budgets:

- management involvement
- adaptability
- accountability according to responsibility
- effective and realistic communication
- acknowledgement
- follow-up and feedback

Assessment

(1) The primary purpose of preparing a budget is to …

1 do profit planning.
2 do cash planning.
3 conduct risk analysis.
4 to estimate sales.

(2) In cash budgeting, the … seasonal and uncertain a firm's cash flows, the … the number of budgeting intervals it should use.

1 more; greater
2 more; fewer
3 less; greater
4 less; fewer

(3) The primary purpose of preparing pro forma financial statements is to …

1 do cash planning.
2 ensure the ability to pay dividends.
3 conduct risk analysis.
4 do profit planning.

(4) The percentage-of-sales method of preparing the pro forma statement of comprehensive income assumes all costs are …

1 fixed.
2 constant.
3 independent.
4 variable.

(5) … generally reflect(s) the anticipated financial impact of planned long-term actions.

1 A cash budget
2 Strategic financial plans
3 Operating financial plans
4 A pro forma statement of comprehensive income

(6) The primary purpose of preparing pro forma financial statements is to …

1 do cash planning.
2 ensure the ability to pay dividends.
3 conduct risk analysis.
4 do profit planning.

(7) The best way to adjust for the presence of fixed costs when using the simplified approach for pro forma statement of comprehensive income preparation is to …

1 vary the fixed costs proportionately with the change in sales.
2 adjust for projected fixed-asset outlays.
3 vary the costs disproportionately with the change in sales.
4 break up the firm's historical costs into fixed and variable components.

Table 4.1

Statement of Comprehensive Income
Vodacom
For the year ended 31 December 2016

Sales	*R2,000,000*
Less: Cost of goods sold	*1,200,000*
Gross profit	*R800,000*
Less: Selling expense	*200,000*
General and administrative expense	*60,000*
Less: Depreciation	*40,000*
Operating profit	*R 500,000*
Less: Interest	*80,000*
Earnings before taxes	*R 420,000*
Less: Taxes (40%)	*168,000*
Net profit after taxes/EACS	*R 252,000*
Common stock dividends	*R 100,000*

(8) Vodacom, a cellphone network provider, is preparing pro forma financial statements for 2017. The firm utilised the percent-of-sales method to estimate costs for the next year. In 2016, sales amounted to R2 million and they are expected to increase to R2.4 million in 2010. The firm has a 40% tax rate.

(a) Given the 2016 statement of financial performance in table 4.1, estimate net profit and retained earnings for 2017.

(b) *If R200,000 of the cost of goods sold and R40,000 of selling expense are fixed costs, and the interest expense and dividends are not expected to change, what is the rand effect on net income and retained earnings?*

(9)

Statement of Comprehensive income
Heita Manufacturing Company
For the year ended 31 December 2016

Sales	*R2,800,000*
Less: Cost of goods sold	*1,820,000*
Gross profits	*R 980,000*
Less: Operating expenses	*240,000*
Operating profits	*R 740,000*
Less: Interest expense	*70,000*
Net profits before taxes	*R 670,000*
Less: Taxes (40%)	*268,000*
Net profits after taxes	*R 402,000*
Less: Cash dividends	*132,000*
To: Retained earnings	*R 270,000*

Heita Manufacturing Company, a cellphone phone provider, estimates that its sales will be R3 million in 2017. Interest expense is expected to remain unchanged at R70,000, and the firm plans to pay cash dividends of R140,000 during 2017. Use the percent-of-sales method to prepare a pro forma statement of comprehensive income for the year ended 31 December 2017, based on the 2016 statement of comprehensive income shown above.

Feedback

Question 1	*Answer 2*
Question 2	*Answer 1*
Question 3	*Answer 4*
Question 4	*Answer 4*
Question 5	*Answer 2*
Question 6	*Answer 4*
Question 7	*Answer 4*
Question 8	*Answer (a) & (b)*

(a)

Pro forma income statement: 31 December 2017	
Sales	*R2,400,000*
Less: Cost of goods sold	*1,440,000*
Gross profit	*960,000*
Less: Selling expense	*240,000*
General and administrative expense	*72,000*
Less: Depreciation	*48,000*
Operating profit	*R 600,000*
Less: Interest	*96,000*
Earnings before taxes	*R 504,000*
Less: Taxes (40%)	*201,600*
Net profit after taxes/EACS	*R 302,400*
Common stock dividends	*120,000*
Retained earnings	*R 182,400*

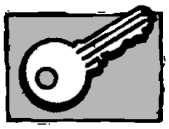
(b)

Sales	*R2,400,000*
Less: Cost of goods sold (0.50)	*1,200,000*
Fixed	*200,000*
Gross profit	*1,000,000*
Less: Selling expense (0.08)	*192,000*
Fixed	*40,000*
General and administrative expense	*72,000*
Less: Depreciation	*48,000*
Operating profit	*R 648,000*
Less: Interest	*80,000*
Earnings before taxes	*R 568,000*
Less: Taxes (40%)	*227,200*
Net profit after taxes/EACS	*R 340,800*
Common stock dividends	*100,000*
Retained earnings	*R 240,800*

Question 9 *Answer*

Pro forma statement of comprehensive income
Heita Manufacturing Company
For the year ended 31 December 2017

Sales	*R3,000,000*
Less: Cost of goods sold (65%)	*1,950,000*
Gross profits	*R1,050,000*
Less: Operating expenses (8.57%)	*257,142*
Operating profits	*R 792,858*
Less: Interest expense	*70,000*
Net profits before taxes	*R 722,858*
Less: Taxes (40%)	*289,143*
Net profits after taxes	*R 433,714*
Less: Cash dividends	*140,000*
To: Retained earnings	*R 293,714*



Key concepts

Breakeven analysis: a framework for understanding the interrelationships between variable costs, fixed costs, sales volume and selling prices

Breakeven point: the activity level at which total costs equal total revenues; operating breakeven point is the level of sales necessary to cover all operating costs – at this point, the earnings before interest and taxes (EBIT) equal zero

Capital budget: an indicator of the expected (budgeted) future capital investment in physical facilities (buildings, equipment, etc.) in order to maintain present or expand future production capacity

Cash budget: indicator of the extent, time and sources of expected cash inflows; the extent, time and purposes of expected cash outflows; and the expected availability of cash in comparison to the expected need for it

Direct labour: salaries paid to employees who work directly on the transformation of direct materials into a finished product, as well as payments to quality inspectors

Direct material: the cost of all materials directly traceable to a finished product, which are necessary to produce the product

Financial budgets: used by financial management in carrying out the financial planning and control task; consist of the capital budget, pro forma statement of comprehensive income and pro forma statement of financial position

Fixed costs: costs remaining constant during a given period for a given potential capacity, irrespective of the degree to which the capacity is utilised during the period

Indirect costs (also called common costs): costs that consists mainly of manufacturing overheads, which comprise all costs not classified as direct material or direct labour, for example, machine lubricants (indirect material), factory cleaning staff (indirect labour), depreciation of machinery and other factory costs such as electricity, heating and telephones used in the factory

Pro forma statement of financial position: drawn up to bring together all the other budgets to project how the financial position of the firm will look at the end of the budget period if actual results conform to planned results

Pro forma statement of comprehensive income: developed to evaluate the budgeted income relative to expenses in the short term and to evaluate plans that could improve profitability

Responsibility centre: any organisational or functional unit in a business, which is headed by a manager responsible for the activities of that unit (All responsibility centres use resources [inputs or costs] to produce something [outputs or income]. Typically, responsibility is assigned to income, cost [expense], profit and/or investment centres.)

Variable costs: unlike fixed costs, these costs change with fluctuations in the number of units produced and sold, for example, packaging material for a product such as a cellular phone, its instruction pamphlets and a battery to accompany each unit

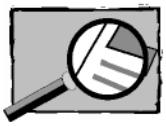
Summary

In this study unit, we examined the important role profit planning and control play in a firm. We discussed the different types of costs, followed by an explanation of cost behaviour. We discussed breakeven analysis and the budgeting processes. The study unit concluded with a description of the principles of budgeting.

Study unit 5

The time value of money

Contents



Overview

The timing of cash flows has important economic consequences because firms and individuals have many opportunities to earn positive rates of return on invested funds. Future value (FV), the value of a present amount at a future date, is calculated by applying compound interest over a specific period. Present value (PV) represents the rand value today of a future amount, or the amount you would invest today at a given interest rate for a specified period to equal the future amount.

Study in the prescribed book

Study chapter 5 entitled "The time value of money" in the prescribed book.

Learning outcomes

Once you have worked through this study unit, you should be able to

- calculate the future value:
  1 at annual compounding
  2 at intra-year compounding
  3 of an annuity
  4 of a single amount
  5 of a mixed stream
- understand the three types of variations of future and present value techniques
- calculate the deposits to accumulate a future sum
- understand the amortisation of loans

- determine the growth rates
- understand the role of time value of money in financial management

5.1 FUTURE VALUE

Future value is the calculation of interest on a present amount to get some future amount. The amount on which interest is paid is known as the principal. Future value is the amount to which the principal will grow by a given future date when compounded at a certain interest rate.

The three types of compounding are as follows:

- annual compounding
- intra-year compounding
- the future value of an annuity

The general formula that can be used to calculate the FV is as follows:

$FVn = PV (1 + i)^n$,

where FVn = the future value of the amount at the end of n periods
PV = the initial principal
i = the annual rate of interest paid
n = the number of periods of the investment

Study the examples of future values on pages 85 and 86 in your prescribed book.

5.2 PRESENT VALUE

Present value is the inverse of future value. The present value (PV) of a future amount indicates how much money today would be equivalent to the future amount if one could invest that amount at a specified rate of interest.

Present value can be calculated for the following types:

- the present value of a single amount
- the present value of a mixed stream
- the present value of an annuity

Study

Study the examples of present value on pages 94 to 95 in your prescribed book.

5.3 VARIATIONS OF FUTURE AND PRESENT VALUE TECHNIQUES

FV and PV techniques have a number of variations. Three of these variations are presented in this section:

- calculation of the deposits needed to accumulate a future sum
- amortisation of loans
- determination of interest or growth rates

5.4 ROLE OF TIME VALUE OF MONEY IN FINANCIAL MANAGEMENT

Time value of money plays a role in several areas of financial decision making.

Time value of money is applied in the following areas in financial decision making:

- financing decisions
- investment decisions
- working capital management
- valuation

Assessment

(1) Wandisile, a first-year BCom student, is investing R1 000 in a savings account at interest of 10% per annum compounded for five years. The end value of the investment is closest to …

1 R1 510,61.
2 R1 610,51.
3 R1 710,51.
4 R1 810,61.

(2) What amount must be invested annually (at the end of each year) for 10 successive years at interest of 10% per annum compounded in order to yield R1 000 000?

1 R42 745,40
2 R54 724,40
3 R57 245,40
4 R62 745,40

(3) At what annual interest rate must a single amount of R1 000 be invested for five years to yield approximately R1 500?

1 8,5%
2 10,8%
3 12,2%
4 13,5%

(4) Calculate the present value of R10 000 received annually for five successive years using a discount rate of 10%.

1 R37 907,87
2 R45 489,44
3 R58 008,87
4 R60 000,10

(5) Calculate the interest or growth rate of the following stream of cash flows:

1992: R1 517
1991: R1 312
1990: R1 210
1989: R1 080

1 6%
2 8%
3 10%
4 12%

(6) R10 000 is invested in a savings account for 10 years at interest of 20% per annum compounded, but the interest is calculated semi-annually. What is the end value of the investment?

1 R 27 670
2 R 47 860
3 R 67 275
4 R 87 410

(7) Najmoon will receive an amount of R1 700 eight years from now. However, if she could receive the amount right now and invested it, Najmoon would be able to earn 8% interest per annum on the amount. What would the amount be worth if she could receive it now instead of after eight years?

1 R1 450
2 R918,46
3 R1 333
4 R1 206,98

Feedback

Question 1 *Answer 2*

Using HP 10BII:
Enter – 1 000 PV
Enter 5 n
Enter 10 i
Enter FV = R1 610,51

You can also use the FVIF table:
FV = 1 000 × FVIF 10%; 5 = 1 000 × 1, 611 = R1 611
Read page 157 of the prescribed book.

Question 2 *Answer 4*

Enter – 1 000 000 FV
Enter 10 n
Enter 10 i
Enter PMT = R62 745,40

You can also use the FVIF table on page 180 of the prescribed book.

Question 3 *Answer 1*

Enter – 1 000 PV

Enter 1 500 FV

Enter 5 n

Enter i = 8,5%

or

1 500 = 1 000 × (1 + r) 5

Enter i = 8,5%

You can also use the FVIF table on page 180 of the prescribed book.

Question 4 *Answer 1*

Enter – 10 000 PMT

Enter 5 n

Enter 10 i

Enter PV = 37 907,87

Question 5 *Answer 4*

Enter – 1 080 PV

Enter 1 517 FV

Enter 3 n

Enter i = 12%

Question 6 *Answer 3*

Enter 10 000 PV

Enter 10 × 2 n

Enter 20/2 i

Enter FV = R67 275

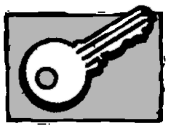
Question 7 *Answer 2*

Enter 1 700 FV

Enter 8 n

Enter 8 i

Enter PV = 918,457



Key concepts

Annual compounding: interest is compounded when the amount earned on the initial principal becomes part of the principal at the end of the first compounding period

Annuity due: an annuity for which the cash flow occurs at the beginning of each period

Future value (FV): the value at a given future time of a present amount of money deposited today in a savings account earning specific interest

Interest rates: the compensation paid by the borrower of funds to the lender; from the borrower's point of view, the cost of borrowing funds

Intra-year compounding: the situation where interest is compounded more often than once a year – Savings institutions compound interest semi-annually, quarterly, monthly, weekly or daily

Loan amortisation: the determination of the equal annual loan payments necessary to provide a lender with a specified interest return and repay the loan principal over a specified term – The loan amortisation process involves finding the future payments (over the term of the loan) so that the present value of the loan just equals the amount of the initial principal borrowed (given the loan interest rate).

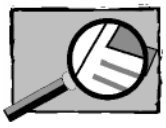
Summary

In this study unit, we covered the various aspects of the time value of money. The focus was on the future value and the present value. We will now move on to the next topic of the module, which will cover capital budgeting.

Study unit 6

Capital budgeting

Contents



Overview

The various capital budgeting techniques that we will consider comprise an effort to quantify decision variables in order to make a final proposal on accepting or rejecting projects and the ranking of projects.

The goal of the financial manager is to maximise shareholders' wealth. This may be accomplished by investing in assets that will add value to the firm. An investment in assets can only add value if its return is greater than the required rate of return. The return may best be measured in terms of the net present value (NPV) and the internal rate of return (IRR).

Study in the prescribed book

Study chapter 6 entitled "Capital budgeting" in your prescribed book.

Learning outcomes

Once you have worked through this study unit, you should be able to

- distinguish between the accept-reject approach and the ranking approach
- distinguish between non-discounted cash flow methods and discounted cash flow techniques
- calculate and interpret the payback period, the net present value (NPV), the profitability index (PI) and the internal rate of return (IRR)
- understand how to compare and interpret the different techniques of capital budgeting

6.1 APPROACHES TO DECISION MAKING

There are two basic approaches to making capital budgeting decisions. These are the accept-reject approach and the ranking approach.

6.1.1 The accept-reject approach

The accept-reject approach involves evaluating capital expenditure proposals to determine whether they are acceptable. It can be used if the firm has unlimited funds at its disposal. If the firm is evaluating projects with a view to capital rationing, only acceptable projects should be considered.

6.1.2 The ranking approach

This approach involves ranking projects based on some predetermined criterion, such as the rate of return. The project with the highest return is ranked first and the project with the lowest acceptable return, last.

6.2 CAPITAL BUDGETING TECHNIQUES

A distinction can be made between capital budgeting techniques that do not discount cash flows (in other words, that do not involve the time value of money) and those that do discount cash flows.

6.2.1 Non-discounted cash flow methods

There are various non-discounted cash flow methods for determining the acceptability of capital expenditure alternatives. One of these techniques is the payback period. The payback period is the number of years required to recover the initial investment. It gives some consideration to the timing of cash flows and therefore the time value of money, in that the payback period should be as short as possible.

On page 109 of your prescribed book is an example of the payback period.

6.2.2 Discounted cash flow techniques

Discounted cash flow techniques (DCF) consider the time value of money explicitly. Net cash flows of a project are discounted to a present value at a specified rate. The concept of present value is based on the belief that the value of money is affected by the time at which it is received.

The following are some of the discounted cash flow techniques:

- *Net present value (NPV)*

The net present value (NPV) is calculated by subtracting the initial investment (II) from the present value of the net cash inflows (CF) discounted at a rate equal to the firm's weighted average cost of capital (WACC):

NPV = sum of the present values of the net cash flows – initial investment.

On page 112 of your prescribed book is an example of the net present value (NPV).

- *Profitability index (PI)*

The PI is sometimes called a benefit-cost ratio. The only difference between the PI approach to capital budgeting and the NPV approach is that the PI measures the present value return per rand invested, while the NPV approach gives the difference in rand between the present value of returns and the initial investment. The PI is calculated by dividing the present value of cash inflows by the initial investment.

PI = total present values of the net cash flows/initial investment

On page 113 of your prescribed book is an example of the PI.

- *Internal rate of return (IRR)*

The IRR is the technique probably used most often to evaluate investment alternatives, but it is considerably more difficult to calculate than NPV and PI.

The IRR is defined as the discount rate that equates the present value of cash inflows with the initial investment associated with the project.

$$\sum_{t=1}^{n} CF / (1 + IRR)\, t - II$$

or

$$\sum_{t=1}^{n} CF / (1 + IRR)\, t - II = 0$$

On page 114 of your prescribed book is an example of the IRR.

6.3 COMPARISON OF TECHNIQUES

Of the three discounted cash flow techniques, NPV and IRR will receive the greatest attention, since they represent completely different approaches to assessing project acceptability.

The question arises: Which approach is better? On a purely theoretical basis, NPV is best. The reason that IRR is preferred in practice may be the general disposition of business people towards rates of return rather than pure rand returns.

Assessment

(1) Examples of sophisticated capital budgeting techniques include all of the following, EXCEPT for …

1 internal rate of return.
2 payback period.
3 annualised net present value.
4 net present value.

(2) All of the following are weaknesses of the payback period, EXCEPT for …

1 a disregard for cash flows after the payback period.
2 only an implicit consideration of the timing of cash flows.
3 the difficulty of specifying the appropriate payback period.
4 that it uses cash flows, not accounting profits.

(3) Among the reasons many firms use, the payback period as a guideline in capital investment decisions involves all of the following, EXCEPT that it …

1 gives an implicit consideration to the timing of cash flows.
2 recognises cash flows that occur after the payback period.
3 is a measure of risk exposure.
4 is easy to calculate.

(4) Old Mutual is evaluating three capital projects. The net present values for the projects are as follows:

Project	***NPV***
1	*R100*
2	*R0*
3	*–R100*

Old Mutual should …

1 accept projects 1 and 2, and reject project 3.
2 accept projects 1 and 3, and reject project 2.
3 accept project 1 and reject projects 2 and 3.
4 reject all projects.

(5) The minimum return that must be earned on a project in order to leave the firm's value unchanged is the …

1 internal rate of return.
2 interest rate.
3 discount rate.
4 compound rate.

(6) Sanlam is evaluating an investment proposal with an initial investment of R5,000 and its cash flows are currently valued at R4,000. The net present value of the investment is …

1 –R1,000.
2 R0.
3 R1,000.
4 R1,25.

(7) Metropolitan has a cost of capital of 13% and it is evaluating three capital projects. The internal rates of return are as follows:

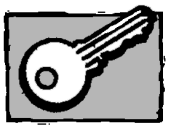
Project	*Internal rate of return*
1	*12%*
2	*15%*
3	*13%*

Metropolitan should …

1 accept project 2 and reject projects 1 and 3.
2 accept projects 2 and 3, and reject project 1.
3 accept project 1 and reject projects 2 and 3.
4 accept project 3 and reject projects 1 and 2.

Feedback

Question 1	*Answer 2*
Question 2	*Answer 4*
Question 3	*Answer 2*
Question 4	*Answer 1*
Question 5	*Answer 3*
Question 6	*Answer 1*
Question 7	*Answer 2*



Key concepts

Accept-reject approach: an approach in financial decision making, which involves evaluating capital expenditure proposals to determine whether they are acceptable; can be used if the firm has unlimited funds at its disposal. (If the firm is evaluating projects with a view to capital rationing, only acceptable projects should be considered).

Discounted cash flow (DCF) techniques: capital budgeting methods that considers the time value of money explicitly; net cash flows of a project are discounted to a present value at a specified rate

Initial investment: the relevant cash outflow for a proposed project at time zero

Net present value: the difference between the initial investment amount and the present value of the expected future cash flows of a project, discounted at the appropriate cost of capital; a direct measure of the value a project creates for the company's shareholders

Payback period: the number of years required to recover an initial investment; considers the timing of cash flows and therefore the time value of money, in that the payback period should be as short as possible

Profitability index (PI): (sometimes called benefit-cost ratio) an approach to capital budgeting calculated by dividing the present value of cash inflows by the initial investment; measures the present value return per rand invested

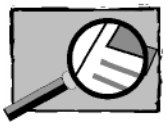
Summary

In this unit, both non-discounted cash flow methods and discounted cash flow techniques were presented, with the discussions centring on the calculation and evaluation of the payback period, NPV, PI and IRR. The next study unit will look at financing.

Study unit 7

Financing

Contents



Overview

It is often said that it takes money to make money. In financing assets, firms can choose between various methods of financing. In this study unit, we will look at debt and equity, and the important considerations to be taken into account in financing assets.

Study in the prescribed book

Study chapter 7 entitled "Financing" in your prescribed book.

Learning outcomes

Once you have worked through this study unit, you should be able to

- distinguish between long-term debt and equity
- differentiate between the characteristics of debt and equity
- determine the cost of capital (required rate of return)
- understand why financial leverage plays an important role in financing
- know the characteristics of the economy, industry and the company
- know the importance of considerations

7.1 LONG-TERM FINANCING

A firm can only finance its fixed assets by means of **equity** or long-term debt. The equity of a company listed on the securities exchange consists of ordinary share capital.

Long-term debt could take various forms: it could be debentures or bonds sold which only pay interest every six months and repay the principal at maturity.

Bonds normally involve the financing of specific assets that also serve as collateral.

Debentures could be used to finance any assets or activities of the firm.

A **mortgage loan** requires monthly instalments over a 20- or 25-year period. Each instalment on a mortgage loan consists of two components: interest and **amortisation** of part of the principal.

7.1.1 Characteristics of debt and equity

When a firm borrows money, it usually gives first claim to creditors on the firm's cash flow. Equity holders are entitled only to the residual value, which is the portion left after the creditors have been paid.

The value of this residual portion is the owner's equity in the firm, which is the value of the firm's assets less the firm's liabilities (debt):

Owners' equity = total assets – liabilities

The following factors distinguish debt from equity:

- maturity
- claims on income
- claims on assets
- the right to a voice in management
- the tax benefit of paying interest

7.2 THE COST OF CAPITAL

The cost of capital is also referred to as the firm's required rate of return. The cost of capital depends on the proportion that each form of financing contributes to the total financing of a firm and the required rate of return on each form of financing.

7.3 FINANCIAL LEVERAGE

Financial leverage (gearing) involves the use of debt financing in order to increase the EPS and the value of the firm.

Look at the examples of financial leverage on pages 122 and 123 in your prescribed book.

7.4 IMPORTANT CONSIDERATIONS IN FINANCING ASSETS

Certain common and conflicting elements or criteria are often involved in the methods used to finance assets.

The considerations are the following:

- suitability
- control
- flexibility
- timing
- characteristics of the economy
- characteristics of the industry
- characteristics of the company

Assessment

(1) The … is the rate of return required by the market suppliers of capital in order to attract their funds to the firm.

1 yield to maturity
2 internal rate of return
3 cost of capital
4 gross profit margin

(2) The … is a weighted average of the cost of funds, which reflects the interrelationship of financing decisions.

1 risk premium
2 nominal cost
3 cost of capital
4 risk-free rate

(3) The specific costs of each source of long-term financing are based on … and … cost.

1 before-tax; historical
2 after-tax; historical
3 before-tax; book value
4 after-tax; current

(4) A tax adjustment must be made in determining the cost of …

1 long-term debt.
2 common stock.
3 preferred stock.
4 retained earnings.

(5) The before-tax cost of debt for a firm that has a 40% marginal tax rate is 12%. The after-tax cost of debt is …

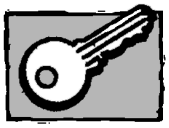
1 4.8%.
2 6.0%.
3 7.2%.
4 12%.

(6) Debt is generally the least expensive source of capital. This is primarily due to …

1 fixed interest payments.
2 its position in the priority of claims on assets and earnings in the event of liquidation.
3 the tax deductibility of interest payments.
4 the secured nature of a debt obligation.

Feedback

Question 1	*Answer 3*
Question 2	*Answer 3*
Question 3	*Answer 4*
Question 4	*Answer 1*
Question 5	*Answer 3*
Question 6	*Answer 3*



Key concepts

Amortisation: repayment of the loan principal over a specified term

Bonds: long-term debt instrument used by business and government to raise large sums of money, generally from a diverse group of lenders

Claims on assets: auctioned when a firm gets into difficulty, especially when its assets are being liquidated (Claims of creditors precede those of the owners; claims of preference shareholders are usually superior to those of residual owners; ordinary shareholders are last in line.)

Cost of capital: the rate used to discount cash flows (the required rate of return) (The terms "discount rate", "opportunity cost" and "weighted average cost of capital" are used interchangeably to refer to the minimum return that must be earned on a project in order to leave the firm's market value unchanged.)

Debentures: loans made to a firm, usually for a predetermined period and at a predetermined interest rate; used to finance any assets or activities of the firm without pledging any assets as collateral

Equity: capital provided by the owners of the firm for an indefinite period; equity holders are entitled only to the residual value (that is, the portion left after the creditors have been paid). (The value of this residual portion is the owners' equity in the firm, which is the value of the firm's assets less the firm's liabilities [debt].)

Financial leverage: the extent to which debt is used to finance the firm; the greater the extent to which a firm makes use of debt, the greater its financial leverage

Gearing (leverage): the extent to which fixed cost assets or fixed cost financing is used to magnify the returns of the firm

Long-term debt: debt that matures in a period exceeding ten years, usually debentures or bonds sold, which only pay interest every six months and repay the principal back at maturity

Medium-term debt: debt that matures from one to ten years

Mortgage loan (bond): a loan backed by liens on land and buildings; the assets serve as collateral and the instalments consist of interest and principal amounts to amortise the loan by the time maturity is reached

Net income: earnings after tax

Residual owners: in a partnership, they are the general partners; in a company, they are the ordinary shareholders

Short-term debt: debt that is scheduled to mature within one year

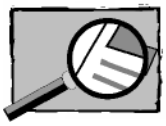
Summary

This study unit introduced you to long-term financing, followed by a discussion of the cost of capital. The study unit concludes with an explanation of financial leverage and the important considerations in financing assets. The next study unit will look at the management of working capital.

Study unit 8

Management of working capital

Contents



Overview

This study unit explains why the effective management of working capital is important for the achievement of the overall objective of a firm, namely wealth maximisation for the owners.

A firm has to manage its inventory, accounts receivable and cash prudently. Working capital is one of the most crucial managerial aspects of any firm, due to the impact it has on liquidity. Too much liquidity in a firm may lower profitability, while poor liquidity may lead to technical insolvency.

Study in the prescribed book

Study chapter 8, entitled "The management of working capital" in your prescribed book.

Learning outcomes

Once you have worked through this study unit, you should be able to

- define net working capital
- promote the cash flow of a firm
- accurately calculate and interpret the operating and cash conversion cycle
- manage the inventory of a firm
- accurately calculate and interpret the economic ordering quantity (EOQ)
- set the re-order point for inventory
- control inventory
- manage accounts receivable

- set credit standards and evaluate applications for credit
- monitor and control accounts receivable
- apply cash management strategies
- compile a cash budget
- prevent cash losses

8.1 THE CASH CONVERSION CYCLE (CCC)

The objective of the financial manager is to manage the cash conversion cycle (CCC) efficiently in order to maintain adequate levels of cash, thereby contributing to the maximisation of the firm's value.

8.1.1 The operating cycle

The operating cycle (OC) may be described as the period that elapses between the building up of inventory and the collection of cash from the sale of that inventory.

The cycle comprises two components, namely the following:

- the average age of inventory (AAI)
- the average collection period (ACP)

Study

Study the examples on page 134 in your prescribed book.

8.1.2 Managing the CCC

The CCC represents the total number of days in the operating cycle of the firm less the APP:

$$CCC = AAI + ACP - APP$$

CCC is also the difference between the number of days the resources are tied up in the OC and the number of days the firm can use spontaneous financing before payment has to be made.

8.2 MANAGING INVENTORY

Inventory is the asset that is least liquid and consequently needs to be managed carefully in order to contribute to the wealth maximisation of the firm. The financial manager's objective is to keep inventory levels as low as possible, thereby saving costs and providing an opportunity to undertake more investments that are profitable.

Production, marketing and procurement managers each view inventory levels differently from the way the financial manager views them.

The following methods can be used to manage inventory to contribute to wealth maximisation of the firm.

8.2.1 Managing inventory as an investment

A firm must make funds available for the purchase and maintenance of inventory, including investment in warehouses and storage facilities. There is an opportunity cost attached to the holding of inventory, which refers to the rate of return that could have been earned by investing the funds in other assets with more or less the same risk.

8.2.2 Classification of inventory

Inventory may be classified into three basic classes namely:

- raw materials
- work in process
- finished goods

8.2.3 Ordering economic quantities of inventory

The cost of inventory is a trade-off between the cost of placing orders regularly (ordering cost) and the cost of carrying inventory (carrying cost). Total inventory costs (TIC) can be determined by adding the ordering costs and the carrying costs:

TIC = total carrying cost + total ordering cost

The objective of inventory management is to maintain a balance between the rising and falling costs that will result in the lowest total cost of inventory for a firm and can be achieved by determining the economic ordering quantity (EOQ).

$$EOQ = \sqrt{\frac{2 \times (F \times S)}{C \times P}}$$

where EOQ = economic ordering quantity
F = fixed costs of placing and receiving an order
S = annual sales in units
C = costs expressed as a percentage of inventory value
P = purchase price per unit

Study

Study the examples on EOQ on page 138 in your prescribed book.

8.2.4 Setting the reorder point

The reorder point can be determined by means of the following equation:

Reorder point = lead time in days × daily requirement

If the estimates for lead times and daily sales rates are correct, the new order should reach the firm more or less when the inventory approaches zero.

8.2.5 Inventory control systems

Inventory control systems vary from very simple to complex, depending on the size of the firm and the nature of its inventories.

8.2.6 Preventing losses of inventory

Losses may occur because of damage to and theft of inventory. Losses should be kept to a minimum. This can be done by means of the following:

- proper control
- preventive measures
- reduction of eventual losses through insurance

8.3 MANAGEMENT OF ACCOUNTS RECEIVABLE

The decision to extend credit to customers normally results in increased sales levels, but not necessarily in increased profitability. Increased sales levels can only be supported by higher levels of inventory and accounts receivable.

In managing accounts receivable, decisions should be made on the following.

8.3.1 Credit selection

Credit selection involves decisions about whether credit should be extended to a customer and, if so, how much.

8.3.2 Credit standards

Credit standards reflect the minimum requirements for extending credit to a customer.

8.3.3 Credit limits

It is important to place a credit limit on the account in order to limit risks to the firm.

8.3.4 Credit terms

The credit terms of a firm specify the repayment terms required of all its credit customers. Typically, credit terms may be indicated as follows in the conditions of sale:

2/10 net days

The above credit terms mean that the client receives a discount of 2% if the account is paid within 10 days from the beginning of the credit period. Should the discount not be taken up, the account must be settled within 30 days from the beginning of the credit period.

8.3.5 Collection policy

The collection policy of a business firm refers to the different procedures it uses to collect accounts receivable once they become due.

8.3.6 Monitoring accounts receivable

The effectiveness of the credit and collection policy of a firm can be monitored by evaluating the payment patterns of debtors and bad debt costs of the business firm. Bad debts are measured in terms of the following ratio:

Bad debts/Credit sales × 100/1

A firm determines certain confidence limits based on the expected value of this ratio.

8.3.7 Collecting outstanding debt

Prompt follow-up is necessary to prevent losses.

8.4 MANAGEMENT OF CASH

Cash is considered the most liquid asset of a firm; firms normally carry other assets that are also high in liquidity. The ability of an asset to be converted readily into cash at short notice, without the possibility of losses attached to its conversion, is referred to as the "liquidity of an asset". These assets are referred to as near-cash assets, an example of which is a marketable security such as a treasury bill.

8.4.1 Motives for holding cash and marketable security balances

Interest earned on marketable securities is also normally much lower than returns on other assets held by the firm. The following are strong motives for holding cash and marketable security balances:

- transaction motive
- compensating balances
- speculative motive
- precautionary motive

8.4.2 The cost of cash

The cost of maintaining cash holdings comprises the following:

- An opportunity cost of foregoing other lucrative investment opportunities is incurred.
- Excessive reliance on internally generated liquidity may also isolate the firm from the short-term financial market, making it difficult to obtain short-term financing quickly and at reasonable rates.
- There is also a cost attached to the holding of cash.

8.4.3 Strategies for cash flow management

Firms with positive cash conversion cycles may pursue certain strategies to minimise the cash conversion cycle. The following are the three main strategies:

- *Stretching accounts payable*

Firms sometimes stretch accounts payable – to pay their bills as late as possible without damaging their credit rating. Although this is a financially attractive strategy, it raises an important ethical issue since it may cause the firm to violate an agreement with a supplier.

Sometimes a firm prefers to settle its account after the discount period in order to preserve cash flow. In such cases, you would have to calculate the cost of foregoing a cash discount as follows:

$CD/(1 - CD) \times 365/N$,

where CD = the cash discount (expressed as a portion)
N = the number of days foregone
365 = days per year

Study

Study the example of a cash discount on page 154 in your prescribed book.

- *Efficient purchasing and inventory management*

Efficient purchasing and inventory management can be achieved in either of the following ways:

a) The firm can increase its inventory turnover through better forecasting of demand and better planning of purchasing to coincide with these forecasts.
b) The firm can reduce the length of the purchasing cycle through better purchasing planning, scheduling and control techniques.

- *Speeding up the collection of accounts receivable*

Speeding up the collection of accounts receivable is another way to reduce the operating cash requirement. Accounts receivable are a necessary cost to the firm, since the extension of credit to customers normally allows the firm to achieve higher levels of sales than would be the case if it operated on a cash basis. The actual credit terms extended are generally dictated by the industry in which the firm operates and are normally related to the nature of the product.

The above strategies all have favourable effects on the overall operating cycle of the firm. Firms should therefore not attempt to implement only one of these strategies, but should rather use a combination thereof to reduce their operating cash requirements.

8.4.4 The cash budget

The cash budget or cash forecast allows the firm to plan its cash needs. The cash budget gives the manager a clear view of the timing of the cash inflows and outflows expected during a given period.

- *Format of the cash budget*

The general format of the cash budget is presented below:

Cash inflow

less: cash outflow
equals: net cash flow
plus: beginning cash balance
less: interest on short-term borrowing (if any)
equals: ending cash balance (before borrowing)

Study

Study the example of a cash budget on pages 156–157 in your prescribed book.

- *Interpreting the cash budget*

The cash budget provides the firm with figures indicating the expected ending cash balance, which can be analysed to determine whether a cash deficit/surplus is expected in each of the months covered by the forecast.

- *Coping with uncertainty in the cash budget*

There are various ways of coping with the uncertainty of the cash budget. One way is by preparing several cash budgets of which one is based on a pessimistic forecast.

8.4.5 Preventing cash losses

Cash is more susceptible to theft than any other asset. Internal control over cash is of vital importance to management and the employees of a firm.

Assessment

(1) The conversion of current assets from inventory into receivables and into cash provides the … of cash used to pay the current liabilities, which represents a (an) … of cash.

1 outflow; inflow
2 use; source
3 source; use
4 inflow; outflow

(2) The goal of working capital management is to …

1 balance current assets against current liabilities.
2 pay off short-term debts.

3 *achieve a balance between risk and return in order to maximise the firm's value.*
4 *achieve a balance between short-term and long-term assets so that they add to the achievement of the firm's overall goals.*

(3) *The … is the period that elapses from the point when the firm makes the outlay to purchase raw materials on account to the point when payment is made to the supplier of the goods.*

1 *cash conversion cycle*
2 *average payment period*
3 *average age of inventory*
4 *average collection period*

(4) *When managing inventories, a good strategy is to increase inventory turnover by doing the following, EXCEPT …*

1 *increase raw materials turnover.*
2 *shorten the production cycle.*
3 *produce low-cost, short-cycle goods.*
4 *increase the turnover of finished goods.*

(5) *Pick n Pay has an average age of inventory of 65 days, an average collection period of 30 days, and an average payment period of 20 days. Pick n Pay's operating cycle is …*

1 *50 days.*
2 *85 days.*
3 *95 days.*
4 *55 days.*

(6) *KFC has projected sales of R100, R200 and R300, in May, June and July respectively. Cash sales are 20% and the balance is collected one month after the sale. The firm's total cash receipts in July …*

1 *R220.*
2 *R200.*
3 *R180.*
4 *cannot be determined with the information provided.*

(7) *Morkels has credit terms of 4/12 net 30 EOM on R20 000's worth of merchandise. Assume 360 days in a year. Calculate the cost of giving up the cash discount.*

1 *12%*
2 *48%*
3 *83,33%*
4 *188,81%*

Feedback

Question 1	*Answer 3*
Question 2	*Answer 3*
Question 3	*Answer 2*
Question 4	*Answer 3*

Question 5 *Answer 3*

Operating cycle = average age of inventory + average debtors
collection period = 65 + 30
= 95 days

Question 6 *Answer 1*

	May	*June*	*July*
Projected sales	*R100*	*R200*	*R300*
Cash sales 20%	*R 20*	*R 40*	*R 60*
Collections		*R 80*	*R160*
Total cash receipts	*R 20*	*R120*	*R220*

Question 7 *Answer 3*

Cost of discount = CD/100% – CD x 360/N
= 0,04/0,96 x 360/18
= 83,33%

Key concepts

Average age of inventory (AAI): the cycle comprises two components, namely, the building up of inventory and the collection of cash from the sale of that inventory

Average collection period (ACP): a useful means for evaluating credit and collection policies; determined by dividing the average daily credit sales into the accounts receivable balance

Average payment period (APP): the period that elapses between buying the products and actually paying for them when firms buy inventory on credit from producers or suppliers; determined by dividing the average daily credit purchases into the accounts payable balance

Carrying cost: the cost of carrying inventory; rises in direct proportion to the size of the order

Cash conversion cycle (CCC): the total number of days in the operating cycle of the firm less the average payment period; the maintenance of adequate levels of cash contributes to the maximisation of the value of the firm

Consumer credit: sales by firms to individuals (management of accounts receivable)

Economic ordering quantity (EOQ): the point where the total cost of ordering and carrying inventory will be at its lowest or optimum level

Finished goods: inventory (stock) held in order to provide an immediate service to the customer or to provide for the immediate demand for a specific product

Marketable security: short-term funds

Near-cash assets: assets that are ready to be converted into cash at short notice without the possibility of losses attached to their conversion (liquidity of assets), for example, a marketable security such as a treasury bill

Net working capital: the difference between current assets and current liabilities (also referred to as net current assets) (If the current assets exceed the current liabilities, the firm is said to have a positive net working capital.)

Operating cycle: the period of time that elapses between the building up of inventory and the collection of cash from the sale of that inventory; comprises two components: the average age of inventory (AAI) and the average collection period (ACP) of sales

Ordering cost: the cost of inventory ordered; declines when orders are placed infrequently and larger quantities of inventories are kept

Perpetual inventory system: a system of continuous stocktaking and information gathering by using accounting records to compute inventory on hand at any given time

Precautionary motive: holding cash to maintain a cushion or buffer to meet unexpected contingencies

Speculative motive: holding cash in order to take advantage of unexpected profitable opportunities, such as bargain purchases, and in the case of multinational firms, exchange rate fluctuations (Nowadays firms rely on reserve borrowing power and marketable securities portfolios rather than actual holdings for speculative purposes.)

Transaction motive: the need for cash to meet payments arising in the ordinary course of business

Turnover: sales of inventory for cash or in credit

Working capital: management of a firm's current assets and current liabilities

Summary

This study unit explained the efficient management of cash inflows and outflows of the firm. The importance of cash balances was indicated with reference to the different motives for holding cash balances. The various costs attached to cash holdings as well as strategies and techniques for the efficient management of cash resources were discussed. Finally, methods for the prevention of cash losses were discussed.

Appendix 1

Using a financial calculator

THE HEWLETT PACKARD HP10B

The HP10B performs two sets of functions. Pressing the shift key invokes the function written at the top of the key. The shift key is situated on the lower left-hand side of the calculator keypad, is a little square key with no marking, and has a yellow/orange tinge.

Please note that the shift key will be denoted as SHIFT in this appendix.

EXAMPLE 1: CALCULATE THE PRESENT VALUE OF A LUMP-SUM AMOUNT

William estimates that it will cost his son R55 000 to attend university in four years' time. How much should he invest today at an annual interest rate of 12% (compounded monthly) to be able to send his son to university in four years' time?

Keystrokes	**Display**
1 SHIFT P/YR	1
55 000 FV	55 000
4 x 12 = 48 N	48
12/12 = 1 I/YR	I
PV =	R–34 114, 23

NB:

(1) The display in the last step has a negative sign because it represents a cash outflow (investments) today.
(2) When the calculator computes an incorrect answer, the usual mistake made is between the number of periods per year and the periodic interest rate. For example, make sure that you are not using a monthly interest rate for annual compounding.

EXAMPLE 2: CALCULATE THE FUTURE VALUE OF A LUMP-SUM AMOUNT

If Tracy invests R5 000 today at an asset-earning 8% rate of return (compounded annually), how much will she have after three years?

Keystrokes	Display
I SHIFT P/YR	1
±5 000 PV	–5 000
8 Y/R	8
3 N	3
FV =	R6 298,56

Appendix 2

Interest tables

TABLE 1

Future-Value Interest Factors for RI compounded at k percent for n Periods:

$$FVIFA_{k,n} = (I + k)^{t-1}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	25%	30%	35%
1	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100	1.110	1.120	1.130	1.140	1.150	1.160	1.200	1.250	1.300	1.350
2	1.020	1.040	1.061	1.082	1.103	1.124	1.145	1.166	1.188	1.210	1.232	1.254	1.277	1.300	1.323	1.346	1.440	1.563	1.690	1.823
3	1.030	1.061	1.093	1.125	1.158	1.191	1.225	1.260	1.295	1.331	1.368	1.405	1.443	1.482	1.521	1.561	1.728	1.953	2.197	2.460
4	1.041	1.082	1.126	1.170	1.216	1.262	1.311	1.360	1.412	1.464	1.518	1.574	1.630	1.689	1.749	1.811	2.074	2.441	2.856	3.322
5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539	1.611	1.685	1.762	1.842	1.925	2.011	2.100	2.488	3.052	3.713	4.484
6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677	1.772	1.870	1.974	2.082	2.195	2.313	2.436	2.986	3.815	4.827	6.053
7	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828	1.949	2.076	2.211	2.353	2.502	2.660	2.826	3.583	4.768	6.275	8.172
8	1.083	1.172	1.267	1.369	1.477	1.594	1.718	1.851	1.993	2.144	2.305	2.476	2.658	2.853	3.059	3.278	4.300	5.960	8.157	11.03
9	1.094	1.195	1.305	1.423	1.551	1.689	1.838	1.999	2.172	2.358	2.558	2.773	3.004	3.252	3.518	3.803	5.160	7.451	10.60	14.89
10	1.105	1.219	1.344	1.480	1.629	1.791	1.967	2.159	2.367	2.594	2.839	3.106	3.395	3.707	4.046	4.411	6.192	9.313	13.79	20.11
11	1.116	1.243	1.384	1.539	1.710	1.898	2.105	2.332	2.580	2.853	3.152	3.479	3.836	4.226	4.652	5.117	7.430	11.64	17.92	27.14
12	1.127	1.268	1.426	1.601	1.796	2.012	2.252	2.518	2.813	3.138	3.498	3.896	4.335	4.818	5.350	5.936	8.916	14.55	23.30	36.64
13	1.138	1.294	1.469	1.665	1.886	2.133	2.410	2.720	3.066	3.452	3.883	4.363	4.898	5.492	6.153	6.886	10.70	18.19	30.29	49.47
14	1.149	1.319	1.513	1.732	1.980	2.261	2.579	2.937	3.342	3.797	4.310	4.887	5.535	6.261	7.076	7.988	12.84	22.74	39.37	66.78
15	1.161	1.346	1.558	1.801	2.079	2.397	2.759	3.172	3.642	4.177	4.785	5.474	6.254	7.138	8.137	9.266	15.41	28.42	51.19	90.16
16	1.173	1.373	1.605	1.873	2.183	2.540	2.952	3.426	3.970	4.595	5.311	6.130	7.067	8.137	9.358	10.75	18.49	35.53	66.54	121.7
17	1.184	1.400	1.653	1.948	2.292	2.693	3.159	3.700	4.328	5.054	5.895	6.866	7.986	9.276	10.76	12.47	22.19	44.41	86.50	164.3
18	1.196	1.428	1.702	2.026	2.407	2.854	3.380	3.996	4.717	5.560	6.544	7.690	9.024	10.58	12.38	14.46	26.62	55.51	112.5	221.8
19	1.208	1.457	1.754	2.107	2.527	3.026	3.617	4.316	5.142	6.116	7.263	8.613	10.20	12.06	14.23	16.78	31.95	69.39	146.2	299.5
20	1.220	1.486	1.806	2.191	2.653	3.207	3.870	4.661	5.604	6.727	8.062	9.646	11.52	13.74	16.37	19.46	38.34	86.74	190.0	404.3
21	1.232	1.516	1.860	2.279	2.786	3.400	4.141	5.034	6.109	7.400	8.949	10.80	13.02	15.67	18.82	22.57	46.01	108.4	247.1	545.8
22	1.245	1.546	1.916	2.370	2.925	3.604	4.430	5.437	6.659	8.140	9.934	12.10	14.71	17.86	21.64	26.19	55.21	135.5	321.2	736.8
23	1.257	1.577	1.974	2.465	3.072	3.820	4.741	5.871	7.258	8.954	11.03	13.55	16.63	20.36	24.89	30.38	66.25	169.4	417.5	994.7
24	1.270	1.608	2.033	2.563	3.225	4.049	5.072	6.341	7.911	9.850	12.24	15.18	18.79	23.21	28.63	35.24	79.50	211.8	542.8	1343
25	1.282	1.641	2.094	2.666	3.386	4.292	5.427	6.848	8.623	10.83	13.59	17.00	21.23	26.46	32.92	40.87	95.40	264.7	705.6	1813
30	1.348	1.811	2.427	3.243	4.322	5.743	7.612	10.06	13.27	17.45	22.89	29.96	39.12	50.95	66.21	85.85	237.4	807.8	2620	8129
35	1.417	2.000	2.814	3.946	5.516	7.686	10.68	14.79	20.41	28.10	38.57	52.80	72.07	98.10	133.2	180.3	590.7	2465	9728	36449
40	1.489	2.208	3.262	4.801	7.040	10.29	14.97	21.72	31.41	45.26	65.00	93.05	132.8	188.9	267.9	378.7	1470	7523	36119	*
45	1.565	2.438	3.782	5.841	8.985	13.76	21.00	31.92	48.33	72.89	109.5	164.0	244.6	363.7	538.8	795.4	3657	22959	*	*
50	1.645	2.692	4.384	7.107	11.47	18.42	29.46	46.90	74.36	117.4	184.6	289.0	450.7	700.2	1084	1671	9100	70065	*	*

*FVIF > 99999

TABLE 2

Future-Value Interest Factors for RI compounded at k percent for n Periods:

$$FVIFA_{k,n} = \sum_{t=1}^{n} (1 + k)^{t-1}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	25%	30%	35%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.010	2.020	2.030	2.040	2.050	2.060	2.070	2.080	2.090	2.100	2.110	2.120	2.130	2.140	2.150	2.160	2.200	2.250	2.300	2.350
3	3.030	3.060	3.091	3.122	3.153	3.184	3.215	3.246	3.278	3.310	3.342	3.374	3.407	3.440	3.473	3.506	3.640	3.813	3.990	4.173
4	4.060	4.122	4.184	4.246	4.310	4.375	4.440	4.506	4.573	4.641	4.710	4.779	4.850	4.921	4.993	5.066	5.368	5.766	6.187	6.633
5	5.101	5.204	5.309	5.416	5.526	5.637	5.751	5.867	5.985	6.105	6.228	6.353	6.480	6.610	6.742	6.877	7.442	8.207	9.043	9.954
6	6.152	6.308	6.468	6.633	6.802	6.975	7.153	7.336	7.523	7.716	7.913	8.115	8.323	8.536	8.754	8.977	9.930	11.259	12.756	14.438
7	7.214	7.434	7.662	7.898	8.142	8.394	8.654	8.923	9.200	9.487	9.783	10.089	10.405	10.730	11.067	11.414	12.916	15.073	17.583	20.492
8	8.286	8.583	8.892	9.214	9.549	9.897	10.26	10.64	11.03	11.44	11.86	12.30	12.76	13.23	13.73	14.24	16.50	19.84	23.86	28.66
9	9.369	9.755	10.16	10.58	11.03	11.49	11.98	12.49	13.02	13.58	14.16	14.78	15.42	16.09	16.79	17.52	20.80	25.80	32.01	39.70
10	10.46	10.95	11.46	12.01	12.58	13.18	13.83	14.49	15.19	15.94	16.72	17.55	18.42	19.34	20.30	21.32	25.96	33.25	42.62	54.59
11	11.57	12.17	12.81	13.49	14.21	14.97	15.78	16.65	17.56	18.53	19.56	20.65	21.81	23.04	24.35	25.73	32.15	42.57	56.41	74.70
12	12.68	13.41	14.19	15.03	15.92	16.87	17.89	18.98	20.14	21.38	22.71	24.13	25.65	27.27	29.00	30.85	39.58	54.21	74.33	101.8
13	13.81	14.68	15.62	16.63	17.71	18.88	20.14	21.50	22.95	24.52	26.21	28.03	29.98	32.09	34.35	36.79	48.50	68.76	97.63	138.5
14	14.95	15.97	17.09	18.29	19.60	21.02	22.55	24.21	26.02	27.97	30.09	32.39	34.88	37.58	40.50	43.67	59.20	86.95	127.9	188.0
15	16.10	17.29	18.60	20.02	21.58	23.28	25.13	27.15	29.36	31.77	34.41	37.28	40.42	43.84	47.58	51.66	72.04	109.7	167.3	254.7
16	17.26	18.64	20.16	21.82	23.66	25.67	27.89	30.32	33.00	35.95	39.19	42.75	46.67	50.98	55.72	60.93	87.44	138.1	218.5	344.9
17	18.43	20.01	21.76	23.70	25.84	28.21	30.84	33.75	36.97	40.54	44.50	48.88	53.74	59.12	65.08	71.67	105.9	173.6	285.0	466.6
18	19.61	21.41	23.41	25.65	28.13	30.91	34.00	37.45	41.30	45.60	50.40	55.75	61.73	68.39	75.84	84.14	128.1	218.0	371.5	630.9
19	20.81	22.84	25.12	27.67	30.54	33.76	37.38	41.45	46.02	51.16	56.94	63.44	70.75	78.97	88.21	98.60	154.7	273.6	484.0	852.7
20	22.02	24.30	26.87	29.78	33.07	36.79	41.00	45.76	51.16	57.27	64.20	72.05	80.95	91.02	102.4	115.4	186.7	342.9	630.2	1152
21	23.24	25.78	28.68	31.97	35.72	39.99	44.87	50.42	56.76	64.00	72.27	81.70	92.47	104.8	118.8	134.8	225.0	429.7	820.2	1556
22	24.47	27.30	30.54	34.25	38.51	43.39	49.01	55.46	62.87	71.40	81.21	92.50	105.5	120.4	137.6	157.4	271.0	538.1	1067	2102
23	25.72	28.84	32.45	36.62	41.43	47.00	53.44	60.89	69.53	79.54	91.15	104.6	120.2	138.3	159.3	183.6	326.2	673.6	1388	2839
24	26.97	30.42	34.43	39.08	44.50	50.82	58.18	66.76	76.79	88.50	102.2	118.2	136.8	158.7	184.2	214.0	392.5	843.0	1806	3834
25	28.24	32.03	36.46	41.65	47.73	54.86	63.25	73.11	84.70	98.35	114.4	133.3	155.6	181.9	212.8	249.2	472.0	1055	2349	5177
30	34.78	40.57	47.58	56.08	66.44	79.06	94.46	113.3	136.3	164.5	199.0	241.3	293.2	356.8	434.7	530.3	1182	3227	8730	23222
35	41.66	49.99	60.46	73.65	90.32	111.4	138.2	172.3	215.7	271.0	341.6	431.7	546.7	693.6	881.2	1121	2948	9857	32423	*
40	48.89	60.40	75.40	95.03	120.8	154.8	199.6	259.1	337.9	442.6	581.8	767.1	1014	1342	1779	2361	7344	30089	*	*
45	56.48	71.89	92.72	121.0	159.7	212.7	285.7	386.5	525.9	718.9	986.6	1358	1874	2591	3585	4965	18281	91831	*	*
50	64.46	84.58	112.8	152.7	209.3	290.3	406.5	573.8	815.1	1164	1669	2400	3460	4995	7218	10436	45497	*	*	*

*FVIFA > 99999

TABLE 3

Future-Value Interest Factors for RI Discounted at k percent for n Periods:

$$PVIF_{k,n} = \frac{1}{(1+k)^n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	25%	30%	35%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.833	0.800	0.769	0.741
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	0.812	0.797	0.783	0.769	0.756	0.743	0.694	0.640	0.592	0.549
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	0.731	0.712	0.693	0.675	0.658	0.641	0.579	0.512	0.455	0.406
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	0.659	0.636	0.613	0.592	0.572	0.552	0.482	0.410	0.350	0.301
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	0.593	0.567	0.543	0.519	0.497	0.476	0.402	0.328	0.269	0.223
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	0.535	0.507	0.480	0.456	0.432	0.410	0.335	0.262	0.207	0.165
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	0.482	0.452	0.425	0.400	0.376	0.354	0.279	0.210	0.159	0.122
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	0.434	0.404	0.376	0.351	0.327	0.305	0.233	0.168	0.123	0.091
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	0.391	0.361	0.333	0.308	0.284	0.263	0.194	0.134	0.094	0.067
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	0.352	0.322	0.295	0.270	0.247	0.227	0.162	0.107	0.073	0.050
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	0.317	0.287	0.261	0.237	0.215	0.195	0.135	0.086	0.056	0.037
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	0.286	0.257	0.231	0.208	0.187	0.168	0.112	0.069	0.043	0.027
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	0.258	0.229	0.204	0.182	0.163	0.145	0.093	0.055	0.033	0.020
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	0.232	0.205	0.181	0.160	0.141	0.125	0.078	0.044	0.025	0.015
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	0.209	0.183	0.160	0.140	0.123	0.108	0.065	0.035	0.020	0.011
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218	0.188	0.163	0.141	0.123	0.107	0.093	0.054	0.028	0.015	0.008
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198	0.170	0.146	0.125	0.108	0.093	0.080	0.045	0.023	0.012	0.006
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180	0.153	0.130	0.111	0.095	0.081	0.069	0.038	0.018	0.009	0.005
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164	0.138	0.116	0.098	0.083	0.070	0.060	0.031	0.014	0.007	0.003
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149	0.124	0.104	0.087	0.073	0.061	0.051	0.026	0.012	0.005	0.002
21	0.811	0.660	0.538	0.439	0.359	0.294	0.242	0.199	0.164	0.135	0.112	0.093	0.077	0.064	0.053	0.044	0.022	0.009	0.004	0.002
22	0.803	0.647	0.522	0.422	0.342	0.278	0.226	0.184	0.150	0.123	0.101	0.083	0.068	0.056	0.046	0.038	0.018	0.007	0.003	0.001
23	0.795	0.634	0.507	0.406	0.326	0.262	0.211	0.170	0.138	0.112	0.091	0.074	0.060	0.049	0.040	0.033	0.015	0.006	0.002	0.001
24	0.788	0.622	0.492	0.390	0.310	0.247	0.197	0.158	0.126	0.102	0.082	0.066	0.053	0.043	0.035	0.028	0.013	0.005	0.002	0.001
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092	0.074	0.059	0.047	0.038	0.030	0.024	0.010	0.004	0.001	0.001
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057	0.044	0.033	0.026	0.020	0.015	0.012	0.004	0.001	*	*
35	0.706	0.500	0.355	0.253	0.181	0.130	0.094	0.068	0.049	0.036	0.026	0.019	0.014	0.010	0.008	0.006	0.002	*	*	*
40	0.672	0.453	0.307	0.208	0.142	0.097	0.067	0.046	0.032	0.022	0.015	0.011	0.008	0.005	0.004	0.003	0.001	*	*	*
45	0.639	0.410	0.264	0.171	0.111	0.073	0.048	0.031	0.021	0.014	0.009	0.006	0.004	0.003	0.002	0.001	0.000	*	*	*
50	0.608	0.372	0.228	0.141	0.087	0.054	0.034	0.021	0.013	0.009	0.005	0.003	0.002	0.001	0.001	0.001	*	*	*	*

*PVIF = .000 when rounded to three decimal places

TABLE 4

Future-Value Interest Factors for RI annuity discounted at k percent for n Periods:

$$FVIFA_{k,n} = \sum_{t=1}^{n} (1+k)^t$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	25%	30%	35%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.887	0.870	0.862	0.833	0.800	0.769	0.741
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	1.713	1.690	1.668	1.647	1.626	1.605	1.528	1.440	1.361	1.289
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	2.444	2.402	2.361	2.322	2.283	2.246	2.106	1.952	1.816	1.696
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	3.102	3.037	2.974	2.914	2.855	2.798	2.589	2.362	2.166	1.997
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	3.696	3.605	3.517	3.433	3.352	3.274	2.991	2.689	2.436	2.220
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	4.231	4.111	3.998	3.889	3.784	3.685	3.326	2.951	2.643	2.385
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868	4.712	4.564	4.423	4.288	4.160	4.039	3.605	3.161	2.802	2.508
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	5.146	4.968	4.799	4.639	4.487	4.344	3.837	3.329	2.925	2.598
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	5.537	5.328	5.132	4.946	4.772	4.607	4.031	3.463	3.019	2.665
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	5.889	5.650	5.426	5.216	5.019	4.833	4.192	3.571	3.092	2.715
11	10.73	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	6.207	5.938	5.687	5.453	5.234	5.029	4.327	3.656	3.147	2.752
12	11.26	10.58	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	6.492	6.194	5.918	5.660	5.421	5.197	4.439	3.725	3.190	2.779
13	12.13	11.35	10.63	9.986	9.394	8.853	8.358	7.904	7.487	7.103	6.750	6.424	6.122	5.842	5.583	5.342	4.533	3.780	3.223	2.799
14	13.00	12.11	11.30	10.56	9.899	9.295	8.745	8.244	7.786	7.367	6.982	6.628	6.302	6.002	5.724	5.468	4.611	3.824	3.249	2.814
15	13.87	12.85	11.94	11.12	10.38	9.712	9.108	8.559	8.061	7.606	7.191	6.811	6.462	6.142	5.847	5.575	4.675	3.859	3.268	2.825
16	14.72	13.58	12.56	11.65	10.84	10.11	9.447	8.851	8.313	7.824	7.379	6.974	6.604	6.265	5.954	5.668	4.730	3.887	3.283	2.834
17	15.56	14.29	13.17	12.17	11.27	10.48	9.763	9.122	8.544	8.022	7.549	7.120	6.729	6.373	6.047	5.749	4.775	3.910	3.295	2.840
18	16.40	14.99	13.75	12.66	11.69	10.83	10.06	9.372	8.756	8.201	7.702	7.250	6.840	6.467	6.128	5.818	4.812	3.928	3.304	2.844
19	17.23	15.68	14.32	13.13	12.09	11.16	10.34	9.604	8.950	8.365	7.839	7.366	6.938	6.550	6.198	5.877	4.843	3.942	3.311	2.848
20	18.05	16.35	14.88	13.59	12.46	11.47	10.59	9.818	9.129	8.514	7.963	7.469	7.025	6.623	6.259	5.929	4.870	3.954	3.316	2.850
21	18.86	17.01	15.42	14.03	12.82	11.76	10.84	10.02	9.292	8.649	8.075	7.562	7.102	6.687	6.312	5.973	4.891	3.963	3.320	2.852
22	19.66	17.66	15.94	14.45	13.16	12.04	11.06	10.20	9.442	8.772	8.176	7.645	7.170	6.743	6.359	6.011	4.909	3.970	3.323	2.853
23	20.46	18.29	16.44	14.86	13.49	12.30	11.27	10.37	9.580	8.883	8.266	7.718	7.230	6.792	6.399	6.044	4.925	3.976	3.325	2.854
24	21.24	18.91	16.94	15.25	13.80	12.55	11.47	10.53	9.707	8.985	8.348	7.784	7.283	6.835	6.434	6.073	4.937	3.981	3.327	2.855
25	22.02	19.52	17.41	15.62	14.09	12.78	11.65	10.67	9.823	9.077	8.422	7.843	7.330	6.873	6.464	6.097	4.948	3.985	3.329	2.856
30	25.81	22.40	19.60	17.29	15.37	13.76	12.41	11.26	10.27	9.427	8.694	8.055	7.496	7.003	6.566	6.177	4.979	3.995	3.332	2.857
35	29.41	25.00	21.49	18.66	16.37	14.50	12.95	11.65	10.57	9.644	8.855	8.176	7.586	7.070	6.617	6.215	4.992	3.998	3.333	2.857
40	32.83	27.36	23.11	19.79	17.16	15.05	13.33	11.92	10.76	9.779	8.951	8.244	7.634	7.105	6.642	6.233	4.997	3.999	3.333	2.857
45	36.09	29.49	24.52	20.72	17.77	15.46	13.61	12.11	10.88	9.863	9.008	8.283	7.661	7.123	6.654	6.242	4.999	4.000	3.333	2.857
50	39.20	31.42	25.73	21.48	18.26	15.76	13.80	12.23	10.96	9.915	9.042	8.304	7.675	7.133	6.661	6.246	4.999	4.000	3.333	2.857