

College of Economic and Management Sciences
School of Accounting Sciences
Department of Management Accounting



Application of Financial Management Techniques

STUDY GUIDE for
MAC3702
Semesters 1 and 2

University of South Africa
Pretoria

Dear Student

Enclosed please find the printed copy of the online study materials from your module. While these printed materials may appear to be different from the online study materials, they are exactly the same and have been copied from the online.

With kind regards

	Telephone number	E-mail
Mr N Masela	012 429 4415	MAC3702-17-S1@unisa.ac.za
Ms C Leonard	012 429 4025	(Semester 01)
Mrs S Büchner	012 429 2266	Or
		MAC3702-17-S2@unisa.ac.za
		(Semester 02)

LECTURERS: MAC3702

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Printed and published by the
University of South Africa
Muckleneuk, Pretoria

MAC3702/1/3/2018

70496668

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PART 1, TOPIC 1 – ADVANCED ANALYSIS OF INFORMATION

INTRODUCTION

Various stakeholders, like management, investors and other interested parties, make decisions about an organisation based on the financial information available. After widespread wildcat strikes in the South African mining industry in 2012, Anglo American Platinum (Amplats) announced its decision to close some of its shafts and retrench approximately 14 000 workers in 2013. The mining company attributed its decision to a loss of 306 000 ounces in production during 2012, which was the equivalent of R4,6 billion in revenue (City Press, 2013). Amplats' management, trade unions and the Department of Mineral Resources engaged early in 2013 to find ways to reverse the mining company's decision and thereby avert pending retrenchments.

All the concerned parties would need financial information about Amplats to make sustainable strategic decisions. When evaluating the financial position of Amplats, these stakeholders should analyse the company's financial statements in order to identify current strengths and weaknesses and to provide appropriate measures to enhance those strengths and correct any weaknesses. You would remember that International Accounting Standard IAS 1 prescribes that financial statements should "...provide information about the financial position, financial performance and cash flows of an entity that is useful to a wide range of users in making economic decisions". The stakeholders can take comfort from the fact that International Financial Reporting Standards (IFRS) require that "financial statements should fairly present the state of affairs of the company and the results of operations for the financial year".

In MAC2602, we introduced you to the sources and limitations of financial information and explored some basic comparisons and ratios. In this module, we will introduce you to some advanced ratios and look at some uses of non-financial performance indicators.

LEARNING OUTCOMES

After studying this topic, you should be able to:

- perform financial analysis and interpret results
- analyse and interpret non-financial information
- describe the limitations of accounting data
- describe the limitations of ratio analysis
- describe key non-financial indicators, including environmental, social and governance (ESG) aspects that can be used to identify and monitor business risks

ASSUMED PRIOR KNOWLEDGE

The following learning outcomes were covered in MAC2602 module (please refer to MAC2602 study guide 2 of 2 to refresh your knowledge):

- defined and identified the sources and limitations of financial information
- explained the objectives of financial analysis
- calculated, analysed and interpreted growth rates and different ratios

THIS TOPIC CONSISTS OF THE FOLLOWING STUDY UNIT:

STUDY UNIT	TITLE
STUDY UNIT 1	ADVANCED ANALYSIS OF INFORMATION

STUDY UNIT 1 ADVANCED ANALYSIS OF INFORMATION

1. Introduction

This study unit is based on **selected sections** from the following chapters of the prescribed textbook, Managerial Finance **7th edition** by Skae et al (referred to as “Skae et al”):

- Chapter 1
- Chapter 2
- Chapter 8

2. The meaning of financial management (chapter 1)

This chapter will help you understand the finance function in an organisation, as well as fundamental principles of financial management. The chapter gives an overview of financial management in line with MAC3702 syllabus, clearly demonstrating how each section fits to the module (see page 12 of Skae et al).

Chapter 1 identifies the key users of the financial and non-financial information and also describes the nature of reporting to these stakeholders. Also covered in this chapter is the non-financial information that companies, mainly listed, are required to report on; and in turn this information is further analysed and interpreted by relevant stakeholders (see figure 1.4 on page 19 of Skae et al).

Relevant sections:

Section	Heading
1.1	<i>Financial management</i>
1.2	<i>Goal of an entity</i>
1.3	<i>Business model or value creation model of an entity</i>
1.4	<i>Stakeholders of an entity</i>
1.5	<i>Risk and return of investors</i>
1.7.2	<i>Sustainability and responsible investment in the capital markets</i>

3. Strategy and Risk (chapter 2)

The chapter looks at the environment an entity operates in, as well as risks involved and describes appropriate strategies it can implement to achieve its overall objectives. In analysing financial and non-financial information, the entity has to consider both the internal environment and the external

environment. For companies to succeed, they need to understand how these internal and external factors influence the company and respond to them appropriately.

Relevant sections:

Section	Heading
2.1	<i>Strategy and the business environment</i>
2.2	<i>The external environment</i>
2.6	<i>Implementing the strategies</i>

4. Financial analysis (chapter 8)

Financial analysis is the evaluation and interpretation of financial data in order to assist in investment and financial decision-making. The primary source of financial data is the financial statements of an entity (viz. Statement of Financial Position, Statement of Financial Performance, Statement of Changes in Equity, Cash Flow Statements and Notes thereof).

One of the financial analysis techniques is financial ratio analysis. Financial ratios are the result of dividing one account balance or financial measurement with another.

Relevant sections:

Section	Heading
8.1	<i>Financial report</i>
8.2	<i>Objectives and users of financial and non-financial analysis</i>
8.3.4	<i>Financial analysis</i>

In the MAC2602 syllabus, a number of ratios were covered in detail – refer to MAC2602 study guide 2 of 2. Additional ratios have been introduced in the prescribed textbook and the outline is given on page 283 of Skae et al. **All ratios** given in the prescribed textbook are part of the MAC3702 syllabus.

5. Interpretation of ratios (chapter 8)

As explained earlier, the purpose of financial analysis is to assist in financial decision making. Therefore, once the ratios have been computed, the next step would be the interpretation of ratios.

Interpretation of (or commenting on) ratios usually involves explaining *why* the ratio is where it is, *what* the impact this is likely to have and *what* can be done to improve the ratio. In interpreting ratios, it is more meaningful to compare the ratios computed in one financial dataset to another financial dataset.

Examples of comparing two financial datasets:

Company A vs Company B

Company A vs Industry

Division A vs Division B

Region A vs Region B

Current period vs Previous period

Note:

When commenting on ratios, the textbook shows different levels of difficulty (fundamental, intermediate and advanced) – this is a mere guide and it is not required in answering questions.

Activity 1.1

Attempt *Funky Junk financial analysis* example on page 289 of Skae et al.

6. Non-financial analysis (chapter 8)

The investors do not only focus on the financial position and performance of the company but also consider the social and environmental aspects of the entity, among other things. The companies are now incorporating non-financial information into their reporting that help investors to understand the environment they operate in better. Such non-financial information is therefore subject to further scrutiny and analysis by the relevant stakeholders of the company.

Examples of non-financial information:

Employment demographics

Carbon emissions and waste management

Community initiatives

BEE ratings

Relevant section:

Section	Heading
8.3.5	<i>Non-financial analysis</i>

Activity 1.2

You have heard that a division of Mzi Manufacturing Ltd operates in the footwear industry. This division runs its manufacturing activities at a plant a few kilometres from Alexandra, Johannesburg. However, Mzi Manufacturing Ltd is reviewing several projects which will diversify its business interests and thereby increase its market share.

REQUIRED

Identify and describe ways in which Mzi Manufacturing Ltd could generally

- a. reduce its environmental impact
- b. improve its social impact

Solution to activity 1.2

a. Environmental impact

Mzi Manufacturing Ltd could reduce their environmental impact by:

- using renewable energy for its manufacturing activities
- going green in the following ways:
 - using recycled material for packaging and avoiding the use of plastic containers or materials which are difficult and costly to recycle
 - making greater use of electronic media for marketing (less paper-based media)
 - using energy-efficient lighting, for example LED

b. Social impact

- sourcing its raw materials locally
- improving its B-BBEE (broad-based black economic empowerment) compliance rating, for instance equipping their black employees (including women and those with disabilities) with core and critical skills, engaging in social and economic development activities around Alexandra
- avoiding child labour practices
- complying with all safety, health and environmental (SHE) regulation

(Source: SAICA Part II Financial management)

7. Limitations of accounting data and ratio analysis (chapter 8)

Relevant sections:

Section	Heading
8.4	<i>Limitations of accounting data</i>
8.5	<i>Limitations of ratio analysis</i>

8. Summary

In this study unit, you learnt to

- calculate and interpret a wide variety of commonly used financial ratios
- describe the limitations of ratio analysis
- describe key non-financial indicators, including environmental, social and governance (ESG) aspects that can be used to identify and monitor business risks

9. Self-assessment questions

Attempt practice question 8-1 *Ithemba Engineering (Pty) Ltd* on page 317 of Skae et al.

PART 2 – CAPITAL STRUCTURE

One of the main objectives of a financial manager is to contribute to the creation of long-term sustainable wealth for the shareholders and other stakeholders of the organisation. When valuing an organisation (i.e. determining owners' wealth) which will be dealt with later in the module, we find that risk-free cash flow and growth are the main determinants of the monetary value of an organisation. The capital structure of an organisation influences both its financial risk and its free cash flow. This in turn influences the fund providers' (the owners' and debt providers') required rate of return.

In part 2, we discuss the two main drivers of an organisation's capital structure, namely the required returns demanded by the capital providers and the cost associated with the identified sources of funding.

PART 2, TOPIC 2 – REQUIRED RETURNS

INTRODUCTION

In topic 1, you learnt that the stakeholders of an organisation are also interested in various non-financial indicators such as production performance and customer satisfaction and financial ratios because these can help them assess the business and financial risk of the organisation. In this topic, we will examine the relationship between risk and return further with reference to capital structure, portfolio theory and the Capital Asset Pricing Model (CAPM).

When you consider all the debate around the liquidation of 1Time Airlines in 2012 and the Gauteng toll-road issue, you will realise how important it is to obtain and structure adequate debt levels to refinance aircraft cost efficiently or to finance improvements to freeways (new national roads). You are probably familiar with the old adage that "one should not put one's eggs in one basket". Portfolio theory deals with strategies to avoid or minimise such outcomes when it comes to your investments. Recall the case of Fidentia, where investors (some of them pensioners) lost all their money because they had invested all their hard-earned savings in one company. We will address some of these issues in this topic.

Topic 2 will conclude with sources and forms of finance that would suit the organisation's desired capital structure and ensure optimal cost of capital. Finance represents the lifeblood that enables a business to grow, expand and thrive, or sometimes, merely survive. Raising finance is therefore very important for any organisation.

LEARNING OUTCOMES

After studying this topic, you should be able to

- explain the advantages and disadvantages of debt finance in terms of financial risk and increased return to shareholders
- demonstrate how to determine the optimal capital structure by means of calculations
- explain the mechanics of the traditional capital structure theory versus that of the Miller and Modigliani theory
- describe the background to portfolio theory
- explain the difference between systematic and unsystematic risk
- evaluate whether the diversification of a portfolio resulted in a reduction of risk (for two assets only)
- explain the derivation and rationale of the securities market line (SML)
- use the CAPM to calculate cost of equity
- calculate the theoretical ex-rights price as well as the value of a right
- evaluate the suitability of different forms of finance for financing different types of assets for different intended purposes
- perform appropriate calculations for various financing options, while considering taxation and other relevant factors, and make recommendations (with specific focus on loan versus lease options)

ASSUMED PRIOR KNOWLEDGE

In MAC2602, you mastered the following basic learning outcomes which relate to this topic:

- explained the theory of capital structure and target capital structure
- analysed the capital structure of an organisation
- explained the concept "cost of capital"
- identified risk factors that can affect the cost of selected forms of financing
- identified the main sources of financing
- explained the basic workings of capital and money markets
- identified possible financial markets
- explained the use of long and short-term financing
- identified long and short-term forms or options of finance
- identified the most appropriate financing instrument relating to equity or debt

- explained the characteristics, advantages and disadvantages of these instruments
- identified other forms of financing

Please refer to your second year guide if you want to refresh your knowledge.

For another perspective, you may also refer to the following sections in the prescribed Skae et al textbook:

Section	Heading
4.1	<i>Debt advantage</i>
4.2	<i>Debt disadvantage</i>
4.3	<i>Financial gearing</i>
7.3	<i>Classification of different forms of finance</i>
7.4.1	<i>Obtaining equity funds</i>
7.4.2	<i>Stock market listing</i>
7.5	<i>Preference shares</i>
7.6	<i>Debt</i>

THIS TOPIC CONSISTS OF THE FOLLOWING STUDY UNITS:

STUDY UNIT TITLE

STUDY UNIT 2 RISK AND RETURN

STUDY UNIT 3 SOURCES AND FORMS OF LONG-TERM FINANCE

STUDY UNIT 2 RISK AND RETURN

1. Introduction

In MAC2602, we introduced you to the concept of capital structure. Capital structure is important in achieving the key objective of an enterprise, namely to optimise the long-term sustainable wealth and well-being of its owners and stakeholders.

In this study unit, we will examine the relationship between risk and return with reference to capital structure and portfolio theory. You will learn how to determine the optimal capital structure of an organisation, differentiate between systematic and unsystematic risk and apply the Capital Asset Pricing Model (CAPM).

When we look at risk and return, it is important to consider the relationship between them. Suppose you are lucky enough to have some spare cash despite the current economic climate. What should you do with it? Assuming you can withstand the urge to spend it all on luxuries, you have a number of options:

- Keeping it under your bed may not be wise, for obvious reasons.
- You could use it to repay debt.
- Investing the cash in a bank savings account could offer some benefits. Firstly, it would be relatively safe. (There is a very small risk that you would not be able to recover your initial investment). Secondly, it should be available on short notice, should you need it for an emergency. Thirdly, it is fairly certain that you will earn some level of return – interest at a predetermined level in this case (to compensate you for the effect of inflation, which would otherwise reduce the value of your spare cash).

But, suppose you choose to invest your money elsewhere, such as in your cousin's corner shop? What then? You would arguably run a higher risk of not recovering your initial investment. It is also unlikely that the money would be repaid on demand. You would also run the risk of not earning a level of return – despite your cousin's promises.

The lesson? When facing a higher risk, a rational investor should require and expect a higher rate of return on their investment. If this is unlikely, the investment would probably not be worthwhile.

This study unit is based on **selected sections** from the following chapters in the prescribed Skae et al textbook:

- Chapter 4
- Chapter 5

2. Debt and financial leverage – various theories

In MAC2602, we introduced you to the potential benefit that debt funding might provide to the equity owners of an organisation. We explored elementary scenarios to demonstrate this principle (the benefit from leverage). We will now delve deeper into some of the more well-known theories that underlie this area. We will explain the mechanics of the traditional theory, compare it to the mechanics of the Miller and Modigliani theory and show how a shareholder can benefit through arbitrage.

Relevant sections:

Section	Heading
4.3	<i>Financial gearing</i>
4.4	<i>Debt as part of the capital structure</i>
4.5	<i>Compensating providers of capital</i>
4.6	<i>Traditional capital structure theory</i>
4.7	<i>The Miller and Modigliani theory</i>
4.9	<i>Optimal capital structure – traditional world</i>

Let's start with an activity to see if you can determine the optimal capital structure of an enterprise.

Activity 2.1

Attempt question 4-1 *Company A* on page 116 of Skae et al.

Note:

You will notice that the cost of debt increased to 16% where the debt:equity ratio = 60%:40% as the cost of debt increase by 6% once the D:E ratio exceeds 50:50.

The optimal capital structure is where the **WACC is least**, namely 18,4%.

Now let's see if you can distinguish between the traditional theory and the theory of Miller and Modigliani.

Activity 2.2

Attempt question 4-8(b) *Rosina Ltd* on page 127 of Skae et al.

Notes:

- ① Please note the assumptions of the Miller and Modigliani theory, especially those relating to taxation.
- ② The two graphs illustrate the different assumptions clearly.

3. Portfolio management

Investors would expect any investment, like property, shares, bonds or unit trusts, to grow in value and to provide them with regular income (such as dividends or interest). Should the latter not materialise, the base strategy would be to preserve capital with the hope of evaluating and adjusting their investment strategies for the future. In real life, some investors manage to preserve their capital and earn decent returns from their investments, but sometimes they lose all their capital, like the Fidentia investors.

The total risk that investors face involves the risk associated with business operations (organisation-specific risk, also called unsystematic risk) and the risk faced by all individuals and entities who have invested in the stock market (also known as market or systematic risk).

Portfolio theory seeks to explore investment strategies that would mitigate the risk of loss of capital and/or reduced expected returns. The cornerstone of such strategies is the concept of diversification. However, systematic risk cannot be eliminated by diversification, as all market participants are subjected to the same risks. In an efficiently managed portfolio, where unsystematic risk has been eliminated by diversification (theoretically), total risk equates to systematic (market) risk.

Relevant sections:

Section	Heading
5.1	<i>Background to portfolio theory</i>
5.2	<i>The concept of risk and return</i>
5.4	<i>Diversification</i>

Activity 2.3

Attempt question 5-1(a) *An investor* on page 164 of Skae et al.

4. The Securities Market Line (SML) and the Capital Asset Pricing Model (CAPM)

The notions of systematic risk and risk-free investments led to the development of the SML and the CAPM. CAPM is used as a model for calculating the required rate of return from an investor perspective.

Relevant sections:

Section	Heading
5.5	<i>The securities market line (SML)</i>
5.6	<i>The capital asset pricing model (CAPM)</i> (only up to "Equity versus asset betas")
5.7	<i>CAPM applications</i> (exclude 5.7.2 and 5.7.3)

Notes:

- ① The SML equates systematic risk (measured by the beta coefficient) to the returns on the asset or portfolio. The market (JSE) has a beta of 1,0 (a perfect correlation with its own returns). An asset or portfolio with a beta of 1,0 matches the market in terms of systematic risk and the associated returns. An asset or portfolio with a beta of 0,75 is less risky than the market in terms of systematic risk, and an asset or portfolio with a beta of 1,1 is more risky than the market by the same measure.
- ② Since the rate of return that the investor requires is paid by the company, it translates into the cost of equity. The CAPM is used to estimate the cost of equity for a company with an equity component in its capital structure.

Note on Example 1: Calculating the beta coefficient

- ① When working through this example please note that you need to swop the headings for the information that relates to the return of Kwnagena Limited's stock and return on the JSE index over a five year period. The Y Variable: Stock Return should be included above the second column and the X Variable: Market return should be included above the third column.

Note on Example 2: Calculating the beta coefficient (solution (i))

- ① Include the following steps in the solution for Arjent

$$\text{Arjent} = \frac{5 \times 0,3 \times 4}{4 \times 4}$$

- ② Include the following steps in the solution for Mercury

$$\text{Mercury} = \frac{7 \times 0,6 \times 4}{4 \times 4}$$

You will note for both Arjent and Mercury that the 4 on top of the line cancels out with the 4 on the bottom of the line.

Activity 2.4

Attempt question 5-1(b) *An investor* on page 164 of Skae et al.

5. Summary

In this study unit, you learnt to

- explain the advantages and disadvantages of debt finance in terms of financial risk and increased return to shareholders
- demonstrate how to determine the optimal capital structure by means of calculations
- explain the mechanics of the traditional capital structure theory versus that of the Miller and Modigliani theory
- describe the background to portfolio theory
- explain the difference between systematic and unsystematic risk
- evaluate whether the diversification of a portfolio resulted in a reduction of risk (for two assets only)
- explain the derivation and rationale of the SML
- use the CAPM to calculate cost of equity

In the next study unit, we will consider sources and forms of long-term finance and its implications for taxation.

6. Self-assessment questions

After working through the relevant sections in the textbook and the material provided in this study unit, you should now be able to answer the selected practise questions in the prescribed Skae textbook at the end of chapters 4 and 5.

QUESTION 1

Attempt question 4-6 *Zambezi (Pty) Ltd* on page 122 of Skae et al.

QUESTION 2

Attempt question 5-4 *United Brew Limited* on page 174 of Skae et al.

QUESTION 3

Attempt question 5-6 *ABC (Pty) Ltd* on page 179 of Skae et al.

STUDY UNIT 3 SOURCES AND FORMS OF LONG-TERM FINANCE

1. Introduction

In MAC2602, we introduced you to the two main capital markets, namely equity markets and debt (or bond) markets. You also learnt about some of the common forms of financing available in these markets.

In this study unit, we investigate some additional forms of financing available. We also consider the relative advantages and disadvantages of each of the common sources of finance. The type of financing also affects the tax deductibility of the payments and interest, which in turn affects the net after tax cost of the financing.

This study unit is based on **selected sections** from chapter 7 in the Skae et al prescribed textbook.

2. Sources of finance

We will briefly recap your MAC2602 knowledge of the different forms of finance and their advantages and disadvantages. We will also look at rights issues as a form of equity finance.

Relevant sections:

Section	Heading
7.3	<i>Classification of different forms of finance</i>
7.4	<i>Equity as a source of finance</i>
7.5	<i>Preference shares</i>
7.6	<i>Debt (only 7.6.1 and 7.6.2)</i>
7.9	<i>Overview of sources and forms of finance</i>

Annexure A in Chapter 7, contains a handy summary of all sources of finance and their uses. If you want to refer to it, only focus on those sources of finance that we have covered in MAC2602 and MAC3702 up to now. We will discuss the other sources of finance in later MAC modules.

We provide some additional guidance on the various forms of finance below:

- ① Make sure you understand the dual role of stock markets – firstly as primary markets, but also as secondary markets. As a **primary** market, the role of the stock market is to assist companies to obtain **new** funding and investments, while as a **secondary** market it facilitates the transfer (buying and selling) of shares and other securities **between** investors.

Note:

The words "stocks" and "securities" are used interchangeably.

- ② Underwriting refers to the process by which investment banks raise investment capital from investors on behalf of organisations. A syndicate of banks underwrites the transaction, which means they have taken on the risk of distributing the securities. Should they not be able to find enough investors, they will have to hold some securities themselves. For example, company X wants to raise new equity finance to the value of R100 million. Investment bank B underwrites it. After the subscription period ends, other investors have only subscribed for new shares to the value of R93 million. Investment bank B now needs to take up R7 million worth of new shares in company X.
- ③ There are two main sources of debt – finance institutions, such as banks, and private investors. Finance institutions usually offer bank loans, while private investors often invest in debentures offered by the company. There is a **secondary** market for debentures, which means that these securities can be **traded** among investors after the initial issue by the company.

Note:

It is important that you understand the reasons, advantages and disadvantages of each form of finance as it has a bearing on the final decision regarding the type of financing to acquire. We cover this in section 3.

Activity 3.1

Afric Ltd has recently decided to issue rights in order to raise additional capital. The company is offering its current shareholders the right to subscribe to one new share at a price of R1,90 each

for every four shares currently held. The total number of shares in issue (before the rights issue) is 100 million shares. The current share price is R2,30.

REQUIRED

Calculate the theoretical ex-rights price as well as the value of a right.

Solution to activity 3.1

$$\text{Theoretical ex-rights price} = \left(\frac{1}{N+1}\right) \times ((N \times \text{cum rights price}) + \text{issue price})$$

Where N = number of shares required to buy one new share

Using the formula above:

$$= \left(\frac{1}{N+1}\right) \times ((N \times \text{cum rights price}) + \text{issue price})$$

$$= \left(\frac{1}{4+1}\right) \times ((4 \times R2,30) + R1,90)$$

$$= R2,22$$

The value of a right is $R2,22 - R1,90 = R0,32$ per new share.

Notes:

- ① The principle is that the current market value of the company's equity (100m shares x R2,30 = R230m) is increased by the value of the cash injection (the value of all the rights taken up at the issue price = $(100\text{m shares} \div 4) \times R1,90 = R47,5\text{m}$). The market value per share after the rights issue is therefore the combined value ($R230\text{m} + R47,5\text{m} = R277,5\text{m}$) divided by the new total number of shares in issue (100m shares + 25m shares = 125m shares). $R277,5\text{m} \div 125\text{m shares} = R2,22$ per share. This is a **theoretical** ex-rights price **assuming all else stays unchanged**.
- ② Existing shareholders would therefore be prepared to pay R1,90 to obtain an additional share. (It is a good discount compared to the current trading price of R2,30). If they sold it for R2,22 on the day that the new shares were listed, they would make a cash profit of R0,32 per share. Their remaining four shares would trade at R2,22 and have a total value of R8,88. If

they added their cash profit of R0,32 to the value of their remaining investment of R8,88, their total wealth would be R9,20. That equals the value of their four shares before the rights issue ($4 \times R2,30 = R9,20$). Hopefully the JSE would react positively to the news of the rights issue (to fund a project that would increase the value of the company over time) and the shares would trade for more than R2,22, thereby increasing all the shareholders' wealth.

3. Criteria for deciding on the form of financing

When an organisation is financially sound, it has access to various forms of financing. The financial manager should consider various factors when deciding which finance to apply for. The providers of the financing also have criteria which an organisation has to meet before they would consider extending the finance.

Relevant sections:

Section	Heading
7.1	<i>Finance the lifeblood</i>
7.2	<i>Which form of finance?</i>
7.6.3	<i>Advantages and disadvantages of debt compared to equity</i>
7.8	<i>Criteria applied by providers of finance/investors</i>
7.10	<i>Deciding on the best financing option</i>

The impact that the source of financing has on cost, control and risk is usually the most important criterion.

Activity 3.2

Thorn Tree Ltd, a company that specialises in landscaping and garden services, decided to expand their business by adding a new team to the existing four teams.

Thorn Tree Ltd has enough garden tools and equipment for the new team to be functional, but they have to invest in an additional vehicle.

They received a number of quotes on vehicles and decided to purchase a light commercial vehicle at the cost of R235 000.

The dealership assisted Thorn Tree Ltd to apply for some finance options for the purchase of the vehicle at CT Bank.

The bank does not provide unsecured loans. Thorn Tree Ltd would like to finance the vehicle over a period of five years. The normal finance rate for small businesses with a good financial status is prime plus two.

REQUIRED

Describe the criteria the bank will use when considering the loan application. Hint: Use the PARTS acronym.

Solution to activity 3.2

P – Purpose: why does the company want to borrow funds?

The company wants to borrow funds to expand their business by investing in an additional vehicle that can be used on daily basis.

A – Amount: how much does the company wish to borrow?

R235 000

R – Repayment: how will the company repay its debt?

Through monthly instalments

T – Term: what is the term of the loan?

60 months

S – Security: can the company provide any security, such as assets, against the loan?

Yes, they could use the new vehicle as security for the loan.

4. The lease or borrow decision

When we consider which form of finance to obtain, we compare the effective after-tax cost of the finance and usually settle for the finance with the lowest after-tax cost (unless other conditions are too strenuous). If the organisation considers debt financing, it is important to remember that the type of debt financing obtained would affect the income tax deductibility of the interest and lease payments as well as any wear and tear allowances that may be claimed on the assets.

Relevant sections:

Section	Heading
7.12	<i>Determine the most cost-effective form of finance</i>
7.14	<i>The lease or buy decision</i>
7.15	<i>Cheap finance</i>

When comparing the leasing option to the borrow option, we consider the following aspects:

	Borrow option	Lease option
Discount rate	After-tax cost of debt	After-tax cost of debt
Cash outflows	Total annual instalment	Total lease payment
Cash inflows	Tax benefit of interest portion Tax benefit of wear and tear deduction	Tax benefit of total lease payment

Note:

The amounts allowed as deductions when calculating the organisations' tax liability are in effect a refund and therefore constitutes a cash inflow.

When considering the borrow option, you will note that the annual instalments and the tax benefit of the interest portion of these instalments, discounted at the after-tax cost of debt, will be equal to the initial capital borrowed. This is the case if the organisation borrows at its existing borrowing rate (which is used when calculating the discount). You may therefore encounter examples where the solution simply shows the initial capital borrowed as a single cash outflow at the start of the period. This is an alternative presentation and is quite correct. See the next activity.

Activity 3.3

A capital amount of R500 000 is borrowed over a period of three years. The interest rate is 10%, and the taxation rate is 30%.

REQUIRED

Determine the present value of the cash flows if

- a. interest is paid annually, and the capital amount is settled at the end of three years
- b. the loan is repaid in three equal instalments

Solution to activity 3.3

- a. Interest paid annually, and capital settled at the end of three years

	0	1	2	3
	Rand	Rand	Rand	Rand
Interest ①		(50 000)	(50 000)	(50 000)
Tax benefit – interest x 30%		15 000	15 000	15 000
Capital redeemed				(500 000)
	0	(35 000)	(35 000)	(535 000)

Net present value at 7% ② (R500 000)

- ① $R500\,000 \times 10\% = R50\,000$
- ② After tax interest rate = interest rate x (1 – tax rate)
= $10\% \times (1 - 0,3)$

- b. Loan repaid in three equal instalments

	0	1	2	3
	Rand	Rand	Rand	Rand
Instalment ③		(201 057,40)	(201 057,40)	(201 057,40)
Interest portion ④		(50 000,00)	(34 894,26)	(18 277,95)
Capital portion ⑤		(151 057,40)	(166 163,14)	(182 779,45)
Tax benefit – interest x 30%		15 000,00	10 468,28	5 483,38
	0	(186 057,40)	(190 589,12)	(195 574,02)

③ The instalment is calculated as follows:

Calculator type	SHARP EL-738		Hp10BII	
	Key in	Display will read	Key in	Display will read
Clear all registers	2ndF CA	0.0000	2ndF C ALL	1 P/YR 0.0000
Number of periods	3 N	3.0000	3 N	3.0000
Interest rate	10 I/Y	10.000	10 I/YR	10.000
Payments	500 000 +/- PV	-500 000	500 000 +/- PMT	-500 000
Calculate the payments	COMP PMT	201 057.40	PMT	201 057.40

④ and ⑤ – amortisation table:

Year	Outstanding capital (beginning) (rand) A	Interest for period (rand) B	Instalments (rand) C	Capital portion (rand) D	Outstanding capital (end) (rand) E
Calculations		(A x 10%)	(See ③)	(C – D)	(A – D)
1	500 000,00	50 000,00	201 057,40	151 057,40	348 942,60
2	348 942,60	34 894,26	201 057,40	166 163,14	182 779,46
3	182 779,46	18 277,95	201 057,40	182 779,46	0,00

Net present value at 7% [interest rate x (1 – tax rate)]: (R500 000)

Note:

Regardless of how the interest is charged and the capital repaid, the net present value of the after-tax cash flows will equal the initial capital outlay (or amount borrowed) as long as the money is borrowed at the organisation's borrowing rate.

Activity 3.4

Attempt question 7-2 *Optical Illusion Ltd* in Chapter 7 Additional Practice Questions (*myUnisa*).

Notes:

- ① Did you notice that for the borrowing option (the loan), the initial outlay is only entered as an outflow of R2,4 million without entering the interest payments and tax deduction of the interest for each year? That is allowed, as the loan is entered into at the same rate as that which is used by the company to evaluate their debt financing, namely 20% (before tax).
- ② For the loan option, the wear and tear allowance of the tax benefit and the maintenance expense after tax are included, as these are cash flows that **differ** from those under the lease options.

Activity 3.5

Attempt question 7-5 *Noble House (Pty) Ltd* in Chapter 7 Additional Practice Questions (*myUnisa*).

5. Summary

In this study unit, you learnt to

- calculate the theoretical ex-rights price as well as the value of a right
- evaluate the suitability of different forms of finance for financing different types of assets for different intended purposes
- perform appropriate calculations for various financing options while considering taxation and other relevant factors, and make recommendations, with specific focus on loan versus lease options.

Notes:

- ① We prefer and recommend that you present your discounted cash flow calculation in tables in the format presented in question 7-6 of the exam practise questions that shows the cash flow for each year separately in each column, and the types of cash flows in the rows.
- ② Outflows are indicated in brackets (xxx) and inflows without brackets.

Example:

	0	1	2
Initial outlay			
Interest payment			
Etc.			
Etc.			
Net cash flow			

NPV @ 10% = R(xxx)

OR

Internal rate of return (IRR) = yy%

In the next topic and two study units, we will investigate how the effective after-tax cost of various listed financing instruments is calculated in order to complete the calculation of the weighted average cost of capital.

6. Self-assessment questions

After working through the relevant sections in the textbook and the material provided in this study unit, you should now be able to answer the selected practise questions in the prescribed Skae textbook at the end of chapter 7 in conjunction with the questions included in the exam practise questions document.

Attempt question 7-4 (b) *Union Cape Manufacturing (Pty) Ltd* in Chapter 7 Additional Practice Questions (*myUnisa*).

PART2, TOPIC 3 – WEIGHTED AVERAGE COST OF CAPITAL

INTRODUCTION

In topic 2 on required returns, you learnt about the effect that various risks have on the rate of return required by providers of equity and debt capital to the organisation. Each investor or lender will require a specific return on their investment or loan – linked to the specific perceived risk attached to the investment or loan. The weighted average cost of capital (WACC) is a rate, expressed as a percentage, which combines these disparate required rates of return (for loans and investments) according to the portion (weighting) that each instrument has of the total capital into an **average** rate of return, required by the investors or lenders of the organisation as a **whole**.

The weighting is based on the market value of the sources of the funds. It implies that you should be able to determine the market value of various sources of listed (or traded) and unlisted instruments in order to complete the WACC calculation.

In MAC2602, you learnt how to value some of the simple financing instruments to calculate the after-tax cost of debt on a simplified basis as well as the WACC. In this module, we will expand the financing decisions to include more complex instruments and additional valuation methods for private equity (equity that is not publicly traded).

LEARNING OUTCOMES

After studying this topic, you should be able to

- identify and explain the various drivers of value for different sources of finance
- determine the fair value of different types of preference shares using a discounted cash flow method
- select a suitable valuation approach, methodology, method or model for the valuation of ordinary private equity, based on the information available, and explain your reasoning
- determine the fair value of ordinary equity using the following valuation methodologies/methods/models:
 - a methodology based on the price of recent investments
 - a methodology based on net assets
 - a method based on a trailing P/E multiple (but be aware of current and forward P/E multiples)

- a method based on a market price multiple
- Gordon's dividend growth model
- identify the factors that require adjustment concerning the value of a similar listed equity share and that of a private equity share
- identify the factors that require adjustment in arriving at sustainable (or maintainable) earnings
- calculate the required after-tax return for various listed instruments when the market value is given
- calculate the required rate of return of other debt funding
- calculate the WACC of an organisation based on a variety of funding

ASSUMED PRIOR KNOWLEDGE

In your MAC2602 module, you mastered the following learning outcomes:

- applied time value of money concepts to present and future cash flow streams
- discounted cash flows to determine net present values
- calculated the effective cost of different forms of financing (yield to maturity, dividend growth model and CAPM)
- performed elementary valuations of certain forms of financing
- calculated the WACC

Please refer to your second year guide if you want to refresh your knowledge.

For another perspective, you may also refer to the following sections in the prescribed Skae et al textbook:

Section	Heading
3.1	<i>Time value of money</i>
3.4	<i>Present value of shares</i>
3.5	<i>Present value of debt</i>

THIS TOPIC CONSISTS OF THE FOLLOWING STUDY UNIT:

STUDY UNIT TITLE

STUDY UNIT 4 WEIGHTED AVERAGE COST OF CAPITAL (WACC)

STUDY UNIT 4 WEIGHTED AVERAGE COST OF CAPITAL (WACC)

1. Introduction

For the purposes of this study unit, we perform valuations of various sources of finance in order to obtain the relative weights of each form of finance within the calculation of the WACC. (We might also use target weights, as explained later).

Valuation is fundamentally the act whereby value is determined. In the present context, this value is normally described as the market value, or to use a more appropriate term, the **fair value**

If the cost of debt or equity is not given, we can also use the market values and cash flow streams of certain financing instruments to obtain the cost of the financing. With regards to equity financing, we have already introduced you to Gordon's dividend growth model and the capital asset pricing model (CAPM) for determining the cost of equity.

This study unit is based on **selected sections** from the following chapters in the Skae et al prescribed textbook:

- Chapter 10
- Chapter 11
- Chapter 4

You should refer to selected sections of chapter 7 as well for calculating the effective cost of certain forms of debt financing (covered in study unit 3).

2. Valuation of preference shares and hybrid debt instruments

In MAC2602, we introduced you to discounted cash flow methods and techniques for valuing simple bonds and debentures. We will now investigate how the principles used in those methods and techniques apply to more complex forms of finance. Equity valuations will be covered later on in this study unit.

2.1 Underlying theory

The sections you are going to study next will sketch the necessary background and explain the underlying theory relating to the valuation of preference shares and debt.

Relevant sections:

Section	Heading
10.1	<i>Reasons for undertaking valuations of preference shares or debt</i>
10.2	<i>The discounted cash flow method</i>

2.2 Valuation of preference shares and hybrid debt instruments

You have now worked through the background information and should understand the interaction of the various drivers of value when using a discounted cash flow method. We will now explore the valuation of preference shares and debt using this method.

Relevant sections:

Section	Heading	Exclusions
10.3	<i>Valuation of preference shares</i>	10.3.3 <i>Tax treatment and valuation inputs</i> – exclude the portion under the heading <i>Hybrid instruments for income tax purposes</i> (study the rest) ①
10.4	<i>Valuation of debt</i>	10.4.3 <i>Tax treatment and valuation inputs</i> ② 10.4.4 <i>Valuing bonds</i> – exclude part (b) of the example/activity ② (study the rest) 10.4.5 <i>Valuing convertible debt</i>

Notes:

- ① For the purposes of this module, we ignore the income tax classification of "hybrid instruments" – that is, we ignore sections 8E and 8F of the Income Tax Act.
- ② The preferred treatment when valuing debt is to discount the expected after-tax cash flows using an after-tax rate. However, due to the complexities introduced by section 24J of the Income Tax Act, we use the simplified approach of valuing debt by discounting pre-tax cash flows using a pre-tax rate for the purposes of this module. (In many circumstances, this should provide the same fair value).

Activity 4.1

Refer to the example in subsection 10.3.5 on page 389 of the Skae et al.

REQUIRED

Use a spread sheet program and attempt to use the formulas function to arrive at the same answer as the textbook.

Solution to activity 4.1

The screenshot below was taken from Microsoft Excel^{® 1}:

¹ Microsoft and Excel are registered trademarks of the Microsoft Corporation, registered in the US and other countries.

	A	B	C	D	E	F	G	H
1		Year:	0	1	2	3	4	5
2			(issue date)					
3				R	R	R	R	R
4	Expected dividend			-63 000	-63 000	-63 000	-63 000	-63 000
5	Redeem capital							-1 000 000
6				-63 000	-63 000	-63 000	-63 000	-1 063 000
7								
8	Fair rate of return		7.50%					
9								
10			R					
11	Net present cost		-951 449					
12								
13	Or alternatively, using discount factors			0.9302	0.8653	0.8050	0.7488	0.6966
14								
15	Net present cost		-951 449	-58 605	-54 516	-50 713	-47 174	-740 442
16								
17	Or, using factors rounded to 4 decimal points:			0.9302	0.8653	0.805	0.7488	0.6966
18								
19	(Same as in the Vigario example)		-951 492	-58 603	-54 514	-50 715	-47 174	-740 486

(Source: Skae and De Graaf, 2012 – used with permission)

This result was obtained using the following formulas:

	A	C	D	E	F	G	H
1	Year: 0		1	2	3	4	5
2		(issue date)					
3			R	R	R	R	R
4	Expected dividend		=((70%*9%)*1000000*1)	=D4	=E4	=F4	=G4
5	Redeem capital						=1000000*1
6			=SUM(D4:D5)	=SUM(E4:E5)	=SUM(F4:F5)	=SUM(G4:G5)	=SUM(H4:H5)
7							
8	Fair rate of return	0.075					
9							
10		R					
11	Net present cost	=NPV(C8,D6,E6,F6,G6,H6)					
12							
13	Or alternatively, using discount factors		=1/(1+\$C\$8)^D1	=1/(1+\$C\$8)^E1	=1/(1+\$C\$8)^F1	=1/(1+\$C\$8)^G1	=1/(1+\$C\$8)^H1
14							
15	Net present cost	=SUM(D15:H15)	=D6*D13	=E6*E13	=F6*F13	=G6*G13	=H6*H13
16							
17	Or, using factors rounded to 4 decimal points		=ROUND(1/(1+\$C\$8)^D1,4)	=ROUND(1/(1+\$C\$8)^E1,4)	=ROUND(1/(1+\$C\$8)^F1,4)	=ROUND(1/(1+\$C\$8)^G1,4)	=ROUND(1/(1+\$C\$8)^H1,4)
18							
19	(Same as in the Vigario example)	=SUM(D19:H19)	=D6*D17	=E6*E17	=F6*F17	=G6*G17	=H6*H17

(Source: Skae and De Graaf, 2012 – used with permission)

Microsoft Excel® tips:

- ① Instead of displaying the solution to the formulas, you can display the formulas by simultaneously pressing <Ctrl> and <~>. (To turn off this feature, repeat the same step).
- ② When entering formulas, you can save time by using absolute references, that is, using the "\$" sign before a column and row reference in order to fix a certain cell's position in a formula and then "dragging" that cell across in order to copy it. For example, we used an absolute reference when referring to cell C8 (by typing \$C\$8) within the formula contained in cell D13. We then "dragged" cell C8 to the right, using the "+" panhandle, in order to copy it across row 13.
- ③ Refer to your AIN2601 study guide for more spreadsheet tips.

3. Valuation of ordinary equity (non-listed)

Ordinary equity is the primary source of the initial funding for an organisation. Without the owners investing some of their own money in the start-up capital, debt providers will not be providing the rest of the required funding. Later expansion of the organisation will require further funding. Whether this is sourced from debt or equity depends on the target capital structure and the market value of the existing debt and equity of the organisation. This section will focus on the valuation theory of ordinary private equity and then explore different methodologies, methods and models used in such an evaluation.

Note:

Private equity refers to the owners' own capital invested in business organisations that are not listed on a securities exchange, that is unincorporated businesses (e.g. sole traders), partnerships and private companies (as well as close corporations, which are still operating but are no longer allowed as new forms of business). Later study units will deal with the valuations of listed shares.

3.1 Background and underlying theory

The sections you are going to study next build on the concepts introduced in MAC2602. The sections below further explain valuation theory.

Relevant sections:

Section	Heading
11.1	<i>Some of the intricacies of value</i>
11.2	<i>Reasons for undertaking business and equity valuations</i>
11.3	<i>Underlying valuation theory</i>
11.4	<i>Factors affecting the value of a business or equity interest</i>

Note:

Some of the sections you studied above refer to issues involving listed equity. We require you to be aware of these issues, as the valuation of private equity in some methodologies start with the value of a similar listed organisation. You should therefore have an understanding of the factors affecting listed shares as well.

3.2 Valuation of ordinary equity

Having worked through the underlying valuation theory, we will now explore certain valuation methodologies, methods and models that could be used to determine the fair value of ordinary equity.

Relevant sections:

Section	Heading	Exclusions
11.5	<i>Other valuation matters</i>	11.5.1.1(d) <i>Black Economic Empowerment (BEE) lock-in discount</i>
11.6.1	<i>Price of recent investment</i>	
11.6.2	<i>Earnings multiples</i> ^①	11.6.2.6 <i>Valuation method based on an MVIC/EBITDA multiple</i>
11.6.3	<i>Market price multiples</i>	
11.6.4	<i>The Gordon Dividend Growth Model</i>	
11.6.7	<i>Net assets</i>	

Notes:

- ① For the purposes of this module and in the context of earnings multiples, we focus on a valuation method based on a **trailing** price/earnings (P/E) multiple. However, you should be aware that multiples could also be expressed as **current** or **forward** multiples. Furthermore, you should be aware that there are other available earnings multiples that we can use for valuations, such as the enterprise value (EV) or the earnings before interest, tax, depreciation and amortisation (EBITDA) multiple (both covered in later modules).
- ② Section 11.6.5 "Models based on Free Cash Flow" will be covered in the study unit on valuations for mergers and acquisitions.

Activity 4.2

Attempt question 11-2 (a)iii and (c) *PreFab (Pty) Ltd* on page 476 of Skae et al.

Activity 4.3

The following information relates to a South African based company. The company recently paid a dividend of R1 500 000 to its shareholders.

The company expect the annual growth in ordinary dividends to be as follows:

Year 1	15%
Year 2	10%
Year 3	8%
Year 4 and onwards	6%

One of the shareholders who own 10% of the company wants to sell his shares, and you are interested in buying the shares on offer. The fair rate of return for similar companies is 16%.

REQUIRED

Calculate the price you would be willing to pay for the 10% (minority) shareholding of the company. (Round your answer to the nearest rand).

Solution to activity 4.3

Step 1 Determining value of company using the fair rate of return provided

YEAR		0 Rand	1 Rand	2 Rand	3 Rand
Expected dividend to be paid					
YEAR 1	1 500 000 x 1,15		1 725 000		
YEAR 2	1 725 000 x 1,10			1 897 500	
YEAR 3	1 897 500 x 1,08				2 049 300
Gordon's dividend growth model year					
4 and onward ①					21 722 580
		0	1 725 000	1 897 500	23 771 880
Fair rate of return ② 16,00%					
			0,862	0,743	0,641
Net present value	18 134 568	0	1 486 950	1 409 843	15 237 775

Calculation

$$\begin{aligned}
 \textcircled{1} \quad P_3 &= \frac{D_4}{k_e - g} \\
 &= \frac{R2\,049\,300 \times 1,06}{16\% - 6\%} \\
 &= \frac{R2\,172\,258}{10\%} \\
 &= R21\,722\,580
 \end{aligned}$$

② Calculate the Present value factor by making use of the following formula:

$$\text{PV factor} = \frac{1}{(1+i)^n}$$

Alternative method

Input in calculation

CF0	0
CF1	1 725 000
CF2	1 897 500
CF3	23 771 880
IR	16%
Calc PV	18 126 858

Step 2 Determine pro rata shareholding

$$\begin{aligned} 10\% \text{ shareholding} &= R18\,134\,568 \times 10\% & \text{OR} &= R18\,126\,858 \times 10\% \\ &= R1\,813\,457 & &= R1\,812\,686 \end{aligned}$$

Step 3 Adjustment for minority holding

$$\begin{aligned} \text{Apply a 12\%}^{\#} \text{ discount} &= R1\,813\,457 \times 88\% & \text{OR} &= R1\,812\,686 \times 88\% \\ &= R1\,595\,842 \times 88\% & &= R1\,595\,164 \end{aligned}$$

Conclusion

You should offer the seller no more than R1 595 842 / R1 595 164 to purchase his 10% minority shares.

Note #:

We did not provide you with the size of the minority discount adjustment, but left it to your own judgement. As long as you used a reasonable adjustment, the marker will mark the discount rate you used in your calculations.

4. Cost of capital and the weighted cost of capital

We introduced you to the concepts "cost of capital" and "WACC" in MAC2602. In this study unit, we will explore these concepts further and illustrate them with practical examples of calculating WACC.

Relevant sections:

Section	Heading
4.10	<i>Cost of capital</i>
4.11	<i>The weighted average cost of capital</i>

Notes:

- Some questions might indicate that a portion of the bank overdraft is considered part of the capital structure. In this case, you should include the portion of the bank overdraft in your WACC calculation. Refer to study unit 8 for more detail.
- Refer to study unit 3 on sources and forms of long-term finance to recap how to calculate the effective after-tax cost of certain forms of financing where tax allowances on the assets come into play. If the capital structure contains this type of funding, you should use yield to maturity (YTM) to calculate the effective after-tax cost of the financing. (For the purposes of MAC3702, we will use YTM and internal rate of return (IRR) interchangeably, as they incorporate the same time value of money principles).
- The valuation of ordinary equity covers all of the financing provided by issued shares, non-distributable reserves, retained income and other distributable reserves. The ordinary shareholder is entitled to all of these. Don't add the reserves to the value of the ordinary equity, as it will be double counting.
- Take taxation into account in the case of a long-term loan.
- Make sure you understand how the market values of the equity, preference shares and long-term loan are calculated.

5. Summary

In this study unit, you learnt to

- identify and explain the various drivers of value for different sources of finance
- determine the fair value of different types of preference shares using a discounted cash flow method
- select a suitable valuation approach, methodology, method or model for the valuation of ordinary private equity, based on information available, and explain your reasoning
- determine the fair value of ordinary equity using the following valuation methodologies/methods/models:
 - a methodology based on the price of recent investments
 - a methodology based on net assets
 - a method based on a trailing P/E multiple (while being aware of current and forward P/E multiples)
 - a method based on a market price multiple
 - Gordon's dividend growth model
- identify the factors that require adjustment concerning the value of a similar listed equity share and that of a private equity share
- identify the factors that require adjustment in arriving at sustainable (or maintainable) earnings
- calculate the required after-tax return for various listed instruments (when the market value is given)
- calculate the required return of other debt funding
- calculate the WACC of an organisation based on a variety of funding

In the next topic, we will discuss how the organisation should evaluate long-term investments.

6. Self-assessment questions

After working through all the relevant sections in the textbook and the guidance and activities provided in this study unit, you should now be able to answer the following self-assessment questions:

QUESTION 1

Attempt question 4-4 *Shingalana Ltd* on page 120 of Skae et al.

QUESTION 2

Attempt question 4-5 *Nzinga & Dulamo Inc.* on page 121 of Skae et al.

QUESTION 3

Attempt question 4-10 *Wishbone (Pty) Ltd* on page 134 of Skae et al.

PART 3 – LONG-TERM INVESTMENTS

In part 2, we discussed capital structure and in the previous topic (topic 3), we emphasised the importance of WACC. In this part, we will concentrate on what the organisation does with the capital (long-term finances) it has sourced. Long-term investments can consist of investing in the organisation's own plants and infrastructure (capital budgeting) or of buying or taking over another existing entity (mergers and acquisitions). These are very important decisions for an organisation, and the financial manager plays a key role in advising management on the final decision.

Shortcomings in an organisation's capital budgeting processes can have serious consequences for its delivery of services and goods to its customers. The power failures ("load shedding") in South Africa which could largely be attributed to insufficient maintenance and lack of power generating capacity of electricity plants, the Gauteng e-toll issue and the failure of 1Time Airlines (Nov 2012) have all highlighted the importance of long-term capital budgeting. However, capital budgeting is just as applicable to small businesses and SMEs when budgeting for plant, machinery, vehicles, office buildings and new outlets.

Sometimes it is more beneficial to purchase equity in an existing business than to buy new assets in order to expand the business. The financial press offers many examples of companies that have merged or have been taken over. Both mergers and acquisitions have far-reaching consequences for the concerned organisations' employees and society in general. Examples are Momentum and Metropolitan (Dec 2010), Walmart and Massmart (finally approved in March 2012), Independent News & Media South Africa (Pty) Ltd (INMSA) taken over by Sekunjalo Independent Media (Pty) Ltd (Sekunjalo Media) (approved in July 2013) and Acucap Properties taken over by Growthpoint Properties.

In part 3, you will learn to appraise long-term investment opportunities by applying advanced capital budgeting techniques. You will also learn to perform preliminary valuations for mergers and acquisitions using discounted cash flow techniques and to identify various non-financial (e.g. operational, environmental, social and governance) issues and risks affecting these investments.

PART 3, TOPIC 4 – ORGANIC GROWTH (CAPITAL BUDGETING)

INTRODUCTION

The first topic of part 3 will focus on organic growth, which is when the organisation grows gradually by reinvesting some of its profits and growing its existing customer base it (excludes buying another business, which we will cover in the topic on mergers and acquisitions). We have already exposed you to some capital budgeting techniques in MAC2602 module. In this topic, you will learn more about using advanced capital budgeting techniques to evaluate capital projects. You will learn to apply the various techniques to arrive at a preliminary investment decision based on the information available and to identify various issues affecting the capital budgeting options and the final decision.

LEARNING OUTCOMES

After studying this topic, you should be able to

- deal with capital rationing by means of the net present value index (NPVI)
- handle differing project lives by means of the equivalent annual income
- calculate the discounted payback period, the internal rate of return (IRR) and the modified rate of return (MRR)
- discuss the advantages of the net present value (NPV) method versus the IRR method
- calculate the nominal and real discount rate
- identify whether to use the nominal or real discount rate, based on the nature of the cash flow inputs
- correctly account for the tax payable, based on taxable income and recoupments as well as wear and tear and scrapping allowance, and the timing thereof
- evaluate an investment decision and determine whether an existing capital asset should be replaced, kept (i.e. continue current operations) or abandoned without replacing it with a new asset
- take qualitative factors into account
- discuss sustainability issues as part of the appraisal decision

ASSUMED PRIOR KNOWLEDGE

This topic relies heavily on your knowledge of the time value of money, which was dealt with extensively in MAC2602. If you get stuck, please refer back to this topic in your MAC2602 study guide and/or consult chapter 3 of the prescribed Skae et al textbook.

In MAC2602 module, you were exposed to the following learning outcomes, which relate specifically to this topic:

- discussed the purpose and importance of capital investment decisions
- classified projects into types of expenditure and types of projects
- determined relevant cash flows for the capital budget of a project
- listed and defined traditional capital budgeting techniques
- listed and defined discounted cash flow capital budgeting techniques
- applied the capital budgeting techniques in the evaluation of different projects, asset acquisitions and investment decisions

THIS TOPIC CONSISTS OF THE FOLLOWING STUDY UNIT:

STUDY UNIT	TITLE
STUDY UNIT 5	ADVANCED CAPITAL BUDGETING

STUDY UNIT 5 ADVANCED CAPITAL BUDGETING

1. Introduction

In MAC2602, we introduced you to basic capital budgeting and discussed various traditional and discounted cash flow techniques. Capital budgeting involves planning for long-term projects that stretch over more than one year. Part of the problem that management faces in this type of decision is that projects may have different investment options and may also differ in lifespan. Add to that the effect of taxation and inflation, and you will agree that the management team requires a specialist to advise them.

Millions if not billions of rand have been allocated incorrectly to projects in the past because inflation adjusted cash flows have been discounted at real rates of return and after-tax cash flows have been discounted at before-tax rates of return. There were also instances where the selling price of an existing machine was set off against the cost of a new machine with an unequal life. In even worse decisions, qualitative factors (for example environmental concerns) were ignored when evaluating capital projects.

In this study unit, you will learn about advanced capital budgeting techniques that can be used to evaluate capital projects. You will also learn how to provide for the effect of taxation and inflation and make the optimal decision when confronted with capital rationing. Lastly, you will learn to apply these various techniques to arrive at a preliminary investment decision based on the information available. You will also be required to apply your knowledge of Microsoft Excel to solve capital budgeting problems with the aid of a spreadsheet.

This study unit is based on **selected sections** from the following chapter in the prescribed Skae et al textbook:

- Chapter 6

Note:

If you use a financial calculator to calculate NPVs or IRRs, you still need to present your answer in tables, displaying the different cash flow items for each year and indicating the values you used for the various inputs. In your calculator, for example Cf1, i or PMT. You will not earn any marks by merely presenting a final answer.

2. Growth, WACC, capital budgeting and financing

Relevant sections:

Section	Heading
4.12	Calculating the growth rate
6.1	Capital budgeting
6.2	Correct WACC to be used
6.5	The keep versus replacement investment decision

Notes:

- ① It is important to note that financing costs are excluded when calculating the NPV for the investment decision, but included when calculating the Net Present Cost (NPC) for the financing decision.
- ② For the investment decision, cash flows are discounted at the WACC, while for the financing decision; cash flows are discounted at the after-tax cost of debt.
- ③ Depreciation is not a cash flow and therefore it is added back. On the other hand, wear and tear that the South African Revenue Services allows on assets is included as deduction from the taxable income from the project (this usually differs from the accounting depreciation and therefore results in deferred tax).

Activity 5.1

Attempt question 6-1 *Mr Kumalo* on page 220 of Skae et al.

Activity 5.2

Attempt question 6-2 *Capstar Ltd* on page 222 of Skae et al

Activity 5.3

Attempt question 6-7 *Mr Skosana* on page 241 of Skae et al.

3. Advanced techniques in capital budgeting

In this section, we will discuss important concepts, such as capital rationing, differing project lives and advanced investment appraisal techniques.

3.1 Capital rationing

In most cases, organisations will not have enough funds to undertake all the projects that will generate a positive NPV. Therefore, they would have to carefully consider which projects to undertake. This is dealt with under the concept of *capital rationing*.

Relevant sections:

Section	Heading
6.3.3	<i>Net Present Value (NPV)</i>
6.3.4	<i>Net Present Value Index (NPVI)</i>

Note:

Distinguish between the following concepts when considering questions on capital rationing:

- dependent and independent events
- mutually exclusive events
- single-period and multi-period rationing (multi-period rationing falls outside the scope of MAC3702)
- divisible and indivisible projects

When you work through examples 1 and 2 of section 6.3.4 make sure that you note the consequences of the figures calculated.

Notes for examples 1 and 2 of section 6.3.4:

- ① Note that investments A and B cannot be chosen, because investment A + investment B = R50 000 + R30 000 = R80 000 > R50 000 (the capital rationing constant).
- ② Note that investments A and C can also not be chosen, because investments A + C = R50 000 + R20 000 = R70 000 > R50 000 (the capital rationing constant).
- ③ Note that investments B and C can be chosen, because investment B + investment C = R30 000 + R20 000 = R50 000 (the capital rationing constant).

- ④ Note that investment A can be chosen on its own, because investment A = R50 000 (the capital rationing constant). However, its return (R4 422) is less than that of investments B and C combined (R5 000).
- ⑤ Note that investment B can be chosen on its own, because investment B = R30 000 < R50 000 (the capital rationing constant). However, its return (R3 563) is less than that of investments B and C combined (R5 000).
- ⑥ Note that investment C can be chosen on its own, because investment C = R20 000 < R50 000 (the capital rationing constant). However, its return (R1 437) is less than that of investments B and C combined (R5 000).

Therefore, the optimal combination of returns that fall within the available capital is that of investments B and C combined.

Activity 5.4

Mabula (Pty) Ltd has R1 500 000 available for investment and must choose between the following two **divisible** projects:

Year	Cash flow for project A (rand)	Cash flow for project B (rand)
0	(1 000 000)	(1 200 000)
1	250 000	400 000
2	300 000	400 000
3	350 000	400 000
4	420 000	400 000
5	450 000	400 000

You can assume that the target WACC is calculated at 12%.

REQUIRED

Determine in which projects the management of Mabula should invest the R1 500 000.

Solution to activity 5.4**Project A**

Year	Cash flow in rand	Discount factor	Present value in rand
0	(1 000 000)	1,000	(1 000 000)
1	250 000	0,893	223 250
2	300 000	0,797	239 100
3	350 000	0,712	249 200
4	420 000	0,636	267 120
5	450 000	0,567	255 150
		NPV	233 820

NPVI (or PI) = 1 233 820 / 1 000 000 = 1,23 (highest)

ALTERNATIVE (using a financial calculator HP10BII)

-1 000 000	CF0
250 000	CF1
300 000	CF2
350 000	CF3
420 000	CF4
450 000	CF5
12	I/YR
NPV	233 755

NPVI (or PI) = 1 233 755 / 1 000 000 = 1,23 (highest)

Project B

Year	Cash flow in rand	Discount factor	Present value in rand
0	(1 200 000)	1,000	(1 200 000)
1	400 000	0,893	357 200
2	400 000	0,797	318 800
3	400 000	0,712	284 800
4	400 000	0,636	254 400
5	400 000	0,567	226 800
		NPV	242 000 (highest)

$$\text{NPVI (or PI)} = 1\,442\,000 / 1\,200\,000 \quad \text{or} \quad 1\,241\,910 / 1\,200\,000$$

$$= 1,20 \quad \quad \quad = 1,20$$

ALTERNATIVE (using a financial calculator HP10BII)

-1 200 000 CF0
 400 000 CF1
 400 000 CF2
 400 000 CF3
 400 000 CF4
 400 000 CF5
 12 I/YR
NPV 241 910

$$\text{NPVI (or PI)} = 1\,441\,910 / 1\,200\,000 = 1,20$$

Projects A and B have contradicting measurements. Based on NPV alone, project B should be selected, as it has the highest NPV. However, the projects are divisible, and we therefore calculate the NPVI as well. Based on NPVI, project A should be selected, as it has the higher NPVI.

The projects are divisible (can be expanded, contracted or combined until a total investment amount of R1 500 000 is reached). For illustrative purposes, consider the following scenarios:

1. The entire R1 500 000 is invested in project A

$$1,5 \text{ of project A} = \text{NPV of } 1,5 \times 233\,820 = \mathbf{R350\,730 \text{ (highest)}}$$

{1.5 is number times project A can be expanded - 1500 000 / 1 000 000}

2. The entire R1 500 000 is invested in project B

$1,25$ of project B = NPV of $1,25 \times 242\,000 = R302\,500$

{1.25 is number times project B can be expanded - $1\,500\,000 / 1\,200\,000$ }

3. The whole of project A is undertaken (R1 000 000) and the balance of R500 000 is used for part of project B

1 of project A and $5/12$ of project B = NPV of $(1 \times 233\,820) + (5/12 \times 242\,000) = R334\,653$

{5/12 is how much of project B is done - $500\,000 / 1\,200\,000$ }

4. The whole of project B is undertaken (R1 200 000) and the balance of R300 000 is used for part of project A

1 of project B and $3/10$ of project A = NPV of $(3/10 \times 233\,820) + (1 \times 242\,000) = R312\,146$

{3/10 is how much of project A is done - $300\,000 / 1\,000\,000$ }

Conclusion

The management of Mabula (Pty) Ltd should invest the R1,5 million in one and a half of project A, as this will achieve the highest NPV.

Notes - Guidelines for single-period capital rationing

- ① When considering mutually exclusive, indivisible projects, select the project with the highest NPV (project B = R242 000).
- ② When considering mutually exclusive, divisible projects, select multiples or fractions of the project with the highest NPV (1,5 of project A = R350 730).
- ③ When considering independent projects, select the projects that generate the highest NPV.
- ④ In all cases, only consider projects with positive NPVs or ones with an IRR that is greater than the hurdle rate.

Activity 5.5

Gold Exploration (Pty) Ltd is investigating various independent projects in which they would like to invest during the next financial year. The target WACC for the company is 12%, and they have R50 million to invest. The cost accountant has prepared the following project summary for presentation to the board of directors:

	A	B	C	D	E
	Rm	Rm	Rm	Rm	Rm
Investment	(50)	(20)	(20)	(20)	(10)
NPV	4,545	2,0	2,2	2,727	1,4545
IRR (%)	20	21	14,84	25	26
NPVI (PI)	?	?	?	?	?

REQUIRED

Prepare an analysis based on NPV, IRR and PI rankings and advise the directors on the project(s) that would optimise the company's investment(s).

(Source: Prof D Stangeland, University of Manitoba (adjusted))

Solution to activity 5.5

Step 1 Determining if all projects are NPV positive

All the projects have positive NPVs, therefore, all can be considered in the analysis.

Step 2 Calculating the NPVI or PI

Capital rationing for a single period applies. We cannot accept all NPV positive projects.

The projects' initial investment amounts as well as their NPVs differ. Therefore, we need to calculate the NPVIs and rank them in terms of profitability.

	A	B	C	D	E
	Rm	Rm	Rm	Rm	Rm
Investment	(50)	(20)	(20)	(20)	(10)
NPV	4,545	2,000	2,200	2,7270	1,4545
NPVI (PI) [(Inv + NPV) / Inv]	1,0909	1,100	1,1100	1,1360	1,145

Step 3 Ranking projects and allocating investment funds

i. Rank in terms of NPV

	Investment required Rm	NPV Rm	Funds remaining Rm	Total NPV Generated Rm
Available			50	
A	50	4,5450	0	4,5450
D	20	2,7270		
C	20	2,2000		
B	20	2,0000		
E	10	1,4545		
				4,5450

ii. Rank in terms of IRR (%)

	Investment required Rm	NPV Rm	IRR (%)	Funds remaining Rm	Total NPV Generated Rm
Available				50	
E	10	1,4545	26	40	1,4545
D	20	2,7270	25	20	2,7270
B	20	2,0000	21	-	2,0000
A	50	4,5450	20		
C	20	2,2000	14,84		
					6,1815

iii. Rank in terms of NPVI (PI)

	Investment required Rm	NPV	NPVI (PI)	Funds remaining Rm	NPV Rm	Total Generated
Available				50		
E	10	1,4545	1,1450	40		1,4545
D	20	2,7270	1,1360	20		2,7270
C	20	2,2000	1,1100	-		2,2000
B	20	2,0000	1,1000			
A	50	4,5450	1,0909			
						6,3815
(highest)						

Recommendation

It is recommended that Gold Exploration invest in projects E, D and C, as this will generate the highest NPV for a total investment of R50 million.

Note:

The objective is to **achieve the highest combined NPV**. Where projects require different investment amounts, a ranking based on NPVI (PI) will achieve the optimum result. We provided rankings (i) and (ii) to prove to you that the optimum result is achieved with ranking (iii) when using the NPVI.

3.2 Projects with unequal lives

Another common problem is when management has to consider profitable projects that have differing lives (or life cycles).

Relevant section:

Section	Heading
6.3.5	<i>Different project life cycles</i>

Activity 5.6

The following information is available for projects A and B:

Year	Cash flow for project A (rand)	Cash flow for project B (rand)
0	(1 000 000)	(1 000 000)
1	330 000	250 000
2	360 000	260 000
3	390 000	280 000
4	420 000	300 000
5	450 000	310 000
6		320 000
7		330 000
8		350 000

You can assume that the target WACC is calculated at 16%.

REQUIRED

Advise the management which project to invest in. Ignore qualitative factors.

Solution to activity 5.6

Step 1 Calculating the NPV of each project

Project A

Year	Cash flow for project A (rand)	Discount factor	Present value (rand)
0	(1 000 000)	1,000	(1 000 000)
1	330 000	0,862	284 460
2	360 000	0,743	267 480
3	390 000	0,641	249 990
4	420 000	0,552	231 840
5	450 000	0,476	214 200
NPV @ 16 %			247 970
PV (annuity) @ 16%		3,274	

Project B

Year	Cash flow for project B (rand)	Discount factor	Present value (rand)
0	(1 000 000)	1,000	(1 000 000)
1	250 000	0,862	215 500
2	260 000	0,743	193 180
3	280 000	0,641	179 480
4	300 000	0,552	165 600
5	310 000	0,476	147 560
6	320 000	0,410	131 200
7	330 000	0,354	116 820
8	350 000	0,305	106 750
NPV @ 16 %			256 090 (highest)
PV (annuity) @ 16%		4,344	

Step 2 Calculating the NPV to infinity (∞) for each project

$$\begin{aligned}\text{NPV to } \infty \text{ for project A} &= \frac{\text{R}247\,970}{3,274 \times 0,16} \\ &= \text{R}473\,369,73 \text{ (highest)}\end{aligned}$$

$$\begin{aligned}\text{NPV to } \infty \text{ for project B} &= \frac{\text{R}256\,090}{4,344 \times 0,16} \\ &= \text{R}368\,453,61\end{aligned}$$

Step 3 Calculating the equivalent annual income

$$\text{Project A} = \text{R}247\,970 \div 3,274 = \text{R}75\,739,16 \text{ (highest)}$$

$$\text{Project B} = \text{R}256\,090 \div 4,344 = \text{R}58\,952,58$$

Note:

" ∞ " is the mathematical symbol for "infinity"; "eternity" or in perpetuity.

Conclusion

If your decision was based on the NPVs of the projects, it is evident that you would choose project B, as it has a higher NPV. However, when you have to choose between projects with different life cycles, you will have to compare the NPV to infinity (∞) for decision-making purposes. Alternatively, you will come to the same conclusion using the equivalent annual income method.

It is therefore evident that project A has a higher NPV to infinity - management must therefore choose project A.

3.3 Advanced investment evaluation techniques

Relevant sections:

Section	Heading
6.3.2	<i>Discounted payback period</i>
6.3.6	<i>Internal rate of return (IRR)</i>
6.3.7	<i>Comparative example of NPV and IRR</i>
6.3.8	<i>Modified internal rate of return (MIRR)</i>

Notes:

- ① The NPV method assumes that all cash flows are re-invested at WACC.
- ② The IRR method makes the erroneous assumption that all cash flows are re-invested at the IRR.
- ③ The MIRR method calculates the future value of all intermediate cash flows to the end of the project at a re-investment rate equal to WACC.
- ④ The NPV method results in a rand value, while the IRR and MIRR methods result in a percentage.

Activity 5.7

You are part of the management team of Nkonki Trucking (Pty) Ltd that needs to decide in which project to invest for the next five years. The following cash flow information is available for the two different projects:

Year	Cash flow for project A (rand)	Cash flow for project B (rand)
0	(15 000 000)	(15 000 000)
1	-	7 500 000
2	6 500 000	6 000 000
3	8 000 000	4 000 000
4	9 000 000	3 000 000

WACC for both the projects was determined at 14%.

REQUIRED

Advise your management team in which project the company should invest by taking the IRR, NPV and MIRR into account. Do all calculations with the help of the financial functions available in MS Excel.

Solution to activity 5.7

Calculating the NPV and IRR of projects A and B

Year	Cash flow for project A (rand)	Cash flow for project B (rand)
0	(15 000 000)	(15 000 000)
1	-	7 500 000
2	6 500 000	6 000 000
3	8 000 000	4 000 000
4	9 000 000	3 000 000
NPV	730 034	671 879
IRR	15,8107%	16,5672%

Formulas in MS Excel

Columns and rows	A	B	C	D	E	F
1						
2	WACC		14%	WACC		14%
3						
4		Year	Cash flow for project A		Year	Cash flow for project B
5			Rand			Rand
6		0	(15 000 000)		0	(15 000 000)
7		1	-		1	7 500 000
8		2	6 500 000		2	6 000 000
9		3	8 000 000		3	4 000 000
10		4	9 000 000		4	3 000 000
11						
12	NPV - Excel	=C6+NPV(C2,C7,C8,C9,C10)			NPV - Excel	=F6+NPV(F2,F7,F8,F9,F10)
13						
14	IRR - Excel	=IRR(C6:C10,0)			IRR - Excel	=IRR(F6:F10,0)
15						

Project A - future value of inflows (year 4)

Years	Cash flow	Future value factor @ 14%	Future value (year 4)
1	-	1,4815	-
2	6 500 000	1,2996	8 447 400
3	8 000 000	1,1400	9 120 000
4	9 000 000	1,0000	9 000 000

Future value at 14%

26 567 400

Project B - future value of inflows (year 4)

Years	Cash flow	Future value factor @14%	Future value (year 4)
1	7 500 000	1,4815	11 111 250
2	6 000 000	1,2996	7 797 600
3	4 000 000	1,1400	4 560 000
4	3 000 000	1,0000	3 000 000

Future value at 14%

26 468 850

Calculating the NPV and MIRR

Year	Cash flow for project A (rand)	Cash flow for project B (rand)
0	(15 000 000)	(15 000 000)
1	-	-
2	-	-
3	-	-
4	26 567 400	26 468 850
NPV - Excel	730 034	671 879
MIRR	15,3624%	15,2553%

Same as initial NPV
based on individual years

Formulas in MS Excel

Columns and rows	A	B	C	D	E	F
1						
2		WACC	14%		WACC	14%
3						
4						
5						
6						
7						
8						
9						
10						
11						
12		NPV - Excel	=C6+NPV(C2,C7,C8,C9,C10)		NPV - Excel	=F6+NPV(F2,F7,F8,F9,F10)
13						
14		MIRR - Excel	=MIRR(C6:C10,0)		IRR - Excel	=IRR(F6:F10,0)
15						

Summary of calculations

	Project A	Project B
NPV – MS Excel	R730 034	R671 879
IRR	15,8107%	16,5672%
MIRR	15,3624%	15,2553%

Conclusion

Although project B has the higher IRR, project A has the higher NPV and MIRR. I therefore recommend that you invest in project A.

Note:

The NPV method is theoretically the more sound and conservative method, and you should usually rather base your decisions on this rather than on the IRR. Remember, the IRR assumes that the project cash flows are reinvested at the IRR rate (15,81% or 16,57% in this question) and not at the WACC rate (14%). Project B had large cash flows at the start of the project, which were earning returns equal to the IRR rate up to the end of the project. This caused its IRR to be higher than that of project A. If you based your investment decision on the project with the higher IRR, you would not have achieved the highest possible NPV. Remember that we can add value to the organisation by increasing the NPV of its future cash flows.

4. Inflation, taxation, relevant/opportunity costs and revenues

Relevant section:

Section	Heading
6.4	<i>The investment decision</i>

Notes:

- ① Inflation adjusted cash flows (i.e. where inflation is included in the cash flows) should be discounted at a nominal rate of return.
- ② Real cash flows on the other hand (i.e. cash flows that are not adjusted for inflation) should be discounted at a real rate of return.
- ③ The difference in the NPV answers is due to the rounding of the PV factors.
- ④ The nominal rate of return is sometimes known as the money rate of return.
- ⑤ Distinguish between general inflation, synchronised inflation and differential inflation.
- ⑥ You can assume that the WACC provided in questions is in nominal terms (unless expressly stated otherwise).

Activity 5.8

The following information is available:

Real rate of return: 12%

Inflation: 6,5%

REQUIRED

Calculate the nominal rate (round your answer to two decimals).

Solution to activity 5.8

$$\begin{aligned}\text{Nominal rate} &= [(1 + R)(1 + i)] - 1 \\ &= [(1 + 0,12)(1 + 0,065)] - 1 \\ &= 19,28\%\end{aligned}$$

Activity 5.9

The following information is available:

Nominal rate: 15%

Inflation: 5%

REQUIRED

Calculate the real rate of return (round your answer to two decimals).

Solution to activity 5.9

$$\begin{aligned}
 \text{Nominal rate} &= [(1 + R)(1 + i)] - 1 \\
 0,15 &= [(1 + X)(1 + 0,05)] - 1 \\
 1,15 &= [(1 + X)(1,05)] \\
 1,15 &= 1,05 + 1,05X \\
 0,10 &= 1,05X \\
 X &= 9,52\% \\
 \text{Real rate of return} &= 9,52\%
 \end{aligned}$$

Activity 5.10

SAA Plats (Pty) Ltd is currently considering an investment in a capital project. An initial capital investment R12,5 million is required. The following information is available in real terms:

Year	Revenue (rand)	Expenses (rand)
1	7 500 000	750 000
2	6 000 000	575 000
3	5 000 000	475 000
4	4 000 000	375 000
Differential inflation per year	7,5%	6,5%

REQUIRED

Advise management as to whether they should invest in this project. The company's target WACC is 26,85%.

Solution to activity 5.10

Year	Calculation	Cash flow after inflation				
		0 (rand)	1 (rand)	2 (rand)	3 (rand)	4 (rand)
0	(12 500 000)	(12 500 000)				
1	7 500 000 x 1,075		8 062 500			
	750 000 x 1,065		(798 750)			
2	6 000 000 x 1,075 ²			6 933 750		
	575 000 x 1,065 ²			(652 179)		
3	5 000 000 x 1,075 ³				6 211 484	
	475 000 x 1,065 ³				(573 776)	
4	4 000 000 x 1,075 ⁴					5 341 877
	375 000 x 1,065 ⁴					(482 425)
		(12 500 000)	7 263 750	6 281 571	5 637 708	4 859 452

WACC (nominal rate of return)
@ 26,85%

1,0000	0,7883	0,6215	0,4899	0,3862
(12 500 000)	5 726 014	3 903 996	2 761 913	1 876 720

NPV**1 768 643****Conclusion**

Management should invest in the project, as the NPV is positive.

5. Qualitative (non-financial) factors

Management cannot base the final decision on the results of financial analyses alone. They should also consider other non-financial factors. Consider some of the scenarios below:

- Imagine you are buying or building a holiday home near the beach. What other factors besides the economic ones would you consider? Why is it important to consider those factors?
- The same would apply when a hospital considers the installation of a MR (magnetic resonance) X-ray device. They would have to consider technical aspects like quality and the risk of obsolescence or outdated technology as well as possible technological advancement.
- When a company considers replacing a labour intensive operation by implementing a capital-intensive mechanical scheme, factors like labour relations and labour unions would have to be considered as well. Take a diamond mine, for example, that has been using labour intensive methods to dig for diamonds. What factors should the mine consider when converting to a mechanised operation?

Relevant section:

Section	Heading
6.8	<i>Qualitative factors</i>

Activity 5.11

Think of some other factors that you should consider when evaluating a decision by Eskom to choose between a coal and nuclear power plant.

Solution to activity 5.11

Consider the following factors:

- the availability of adequate funding
- the availability and price of coal
- the technical knowhow to construct and maintain a nuclear reactor
- the availability of water to cool the reactor
- carbon emissions and global warming
- other green objectives
- the future demand for electricity
- the risk of nuclear contamination
- the availability of skilled staff

Note:

Always consider qualitative factors as well before making a final decision.

6. Summary

In this study unit, you learnt to

- deal with capital rationing by means of the NPVI
- handle differing project lives by means of the equivalent annual annuity
- calculate the discounted payback period, the IRR and the MRR
- discuss the advantages of the NPV method versus the IRR method
- calculate the nominal and real discount rate
- identify whether to use the nominal or real discount rate based on the nature of the cash flow inputs
- correctly account for the tax payable based on taxable income and the recoupment of wear and tear and scrapping allowance as well as the timing thereof
- evaluate an investment decision and determine whether an existing capital asset should be replaced, kept (continue current operations) or abandoned (without replacing it with a new asset)
- take qualitative factors into account
- discuss sustainability issues as part of the appraisal decision

PART 3, TOPIC 5 – MERGERS AND ACQUISITIONS (M&As)

INTRODUCTION

As discussed in topic 4, the traditional method of growth is organic growth, where a company grows its existing business through the use of its own internal resources, as opposed to buying another business in order to achieve growth. Pick n Pay achieves its growth by constructing its supermarkets or renting retail space in shopping malls owned largely by pension funds. In the current highly competitive environment, organic growth often proves to be a slow growth strategy. In order to achieve rapid growth, companies often resort to either merging with an existing company, or purchasing another company outright. Examples of M&As that took place in South Africa in recent years include the following:

- China Investment Corporation (CIC) acquired a 25% stake in Shanduka Group in 2011.
- Nippon Telegraph and Telephone Corporation of Japan (NTT) acquired 100% of Dimension Data in 2010.
- Walmart acquired Massmart in 2012.
- Richrau (Pty) Ltd and Avusa Ltd merged in 2012.

With many CEOs claiming that M&As will accelerate the growth of their organisations beyond that which could be obtained organically **and** could generate significant synergies, it is not surprising at all that vast sums of money are invested in M&As every year.

In this regard, however, recent economic events – including the global economic crisis since 2008 and the on-going European debt crisis since 2009 – have undeniably put a damper on global M&A activity. Amongst other things, these events had a strong **negative** effect on both investor sentiment and the availability of cheap debt finance from banking institutions.

Yet, Forbes Magazine pegs 2013 as the year in which global M&A activity will make a comeback – not because the economic crises are over (far from it), but indeed as a result of some of the **other** effects of these events: business organisations have started to stockpile cash, and inflated valuations have normalised in 2012.

For the purposes of this module, the topic of M&As represents the culmination of several previous topics. As such, you will have to combine your knowledge of many preceding management accounting study units, as well as some of your knowledge from other subjects, including your

knowledge of the valuation of instruments, discounted cash flows, calculation of earnings per share (EPS) and of several Acts, including the Companies Act 71 of 2008.

LEARNING OUTCOMES

After studying this topic, you should be able to

- differentiate between the various forms of M&As
- understand the reasons for M&As
- explain why M&As sometimes fail
- identify the various regulatory mechanisms for M&As
- determine the fair value of a business organisation or an equity shareholding using the free cash flow model
- consider the correct valuation method depending on whether the minimum, maximum or fair value is determined
- describe what is meant by synergies between different business entities, and reflect on which synergies to include in a valuation when determining the **fair value** of a business organisation or an equity shareholding
- identify various forms of funding available for M&As
- calculate and discuss the effects of M&As and the method of funding on key financial ratios

Note:

In topic 3 of MAC3702 you have already learnt to apply the following valuation methodologies, methods, or models to equity instruments (shares):

- the price of recent investment
- the value of net assets
- a trailing P/E multiple
- a market price multiple
- Gordon's dividend growth model

We can use all of these methods to do a valuation of a target company in a M&A. Some of the activities and questions in this topic will include these methodologies in addition to a discounted cash flow valuation.

ASSUMED PRIOR KNOWLEDGE

Most of the learning outcomes covered in this topic were not covered in previous modules; therefore you should pay careful attention when working through the contents of this topic.

THIS TOPIC CONSISTS OF THE FOLLOWING STUDY UNITS:

STUDY UNIT	TITLE
STUDY UNIT 6	BUSINESS AND LEGAL ASPECTS
STUDY UNIT 7	ELEMENTARY PRICING (VALUATION) AND FINANCING ISSUES

STUDY UNIT 6 BUSINESS AND LEGAL ASPECTS

1. Introduction

When we mention M&As, most students immediately think of the accounting requirements for business combinations. Although the accounting part is very important, it is only performed once numerous other activities have taken place. These other "upfront" activities are the most important and can make or break a merger or acquisition.

This study unit does not deal with the accounting aspects of M&As (see your financial accounting module for more information on this) nor does it deal with issues pertaining to valuations (see study unit 7). However, this information serves as a background to the topic on M&As.

This study unit is based on **selected sections** from chapter 12 in the prescribed Skae et al textbook.

Relevant sections:

Section	Heading
12.1.1	<i>Forms of mergers and acquisitions</i>
12.1.2	<i>Reasons for takeovers and mergers (Notes 1 & 2)</i>
12.1.3	<i>Why mergers sometimes fail</i>
12.1.4	<i>Legal implications</i>

Notes:

- ① In MAC3702, you should be able to list and discuss the reasons for M&As. In later MAC modules, you will be required to identify these from longer case studies.
- ② Synergy and cost savings are two of the important reasons for M&A activities. The effects of these two aspects feature prominently in the valuation exercises that are done for M&As. You will learn more about this later in the topic.

2. Summary

In this study unit, you learnt to

- differentiate between the various forms of M&As
- understand the reasons for M&As
- explain why M&As sometimes fail
- identify the various regulatory mechanisms for M&As

In the next study unit, we will explore how to do a financial valuation for a M&A transaction, investigate the factors that influence this value and consider the financial impact of a M&A on the key ratios of the target company and the acquiring company.

Proceed to Study Unit 7 before you attempt the Self-assessment questions in Chapter 12 of your prescribed Skae et al. textbook.

STUDY UNIT 7 ELEMENTARY PRICING (VALUATION) AND FINANCING ISSUES

1. Introduction

In the previous study unit, we investigated the business and legal background to M&As. We will now focus on the financial impact of M&As. Valuations of business organisations within the context of M&As build on the concepts we introduced in study unit 4 (valuation of instruments).

For purposes of this study unit, we may ask you to determine the price of the target organisation, sometimes while considering the effect of synergies. In this regard, you may act as an appraiser on behalf of the target or the acquiring organisation, or otherwise as an independent appraiser. As a result, you may have to determine (1) a minimum price for the target organisation (normally to be considered by the target organisation's current owners), (2) a maximum bid price for the target organisation (payable by the acquiring organisation, without destroying value by overpaying), or (3) a fair value for the target organisation (normally when acting as an independent appraiser).

In order to determine value – however defined – you will have to employ a valuation methodology, method or model. We explored most of these in study unit 4, which dealt with the valuation of instruments. In this study unit, we will introduce you to a valuation model based on free cash flow. We will then introduce the concept of synergies and discuss other factors that influence the price (valuation) and the acceptance or rejection of the offer.

This study unit is based on **selected sections** from the following chapters in the prescribed Skae et al textbook:

- Chapter 11
- Chapter 12

2. Valuation model based on free cash flow (available to the business organisation)

In MAC2602, we introduced you to investment decisions, which assessed capital investments for the purposes of an organisation's organic growth (internal growth). Study unit 5 expanded on the techniques available for appraising organic investment opportunities. You are therefore familiar with the technique of discounting future cash inflows and outflows.

In study unit 4 of this module, you further explored the valuation of instruments using several methodologies, methods and models. Although the aim was primarily to determine the value of the organisation's own (internal) capital for the purposes of calculating its WACC, it also paved the way for assessing **external** opportunities, such as investing in **external debt**, **preference shares** or **equity** as investments.

The sections you are going to study next will sketch the necessary background and explain the underlying theory relating to the valuation of a specific external growth opportunity, namely investing in a target organisation by means of a M&A. In this regard, we will also introduce a valuation model based on free cash flow – that is, free cash flow available to the business organisation.

Relevant sections:

Section	Heading	Exclusions
11.4.7 #	<i>Level of control</i>	
11.4.8 #	<i>Share publicly traded on a securities exchange</i>	
11.5.1 #	<i>Valuation premium and discounts (including the example)</i>	Exclude any sections referring to BEE discounts and part (b) of the example.
11.6.5	<i>Models based on Free Cash Flow</i>	11.6.5.1(f) Study the first part of (f), but exclude “Exit multiples” and “The McKinsey Convergence Value-Driver formula” Exclude 11.6.5.2

Note:

These sections also formed part of your reading for study unit 4, but we repeat them here to emphasize their applicability to discounted cash flow (DCF) valuations (not only to the multiples methods).

Activity 7.1

Attempt question 11-1 *Family-run Retailer* on page 472 of Skae et al.

Activity 7.2

Attempt question 11-3 *ElectriBolt Ltd* on page 484 of Skae et al.

Activity 7.3

Attempt question 11-4 *Blue Bowl Ltd* on page 490 of Skae et al.

3. M&A valuation considerations

Relevant section:

Section	Heading
12.2	<i>Valuation considerations</i>

4. Financial effects of acquisition and method of funding on key financial measures

Within the context of a merger or acquisition, the various parties, especially shareholders, are interested in their financial standing before and after the merger or acquisition. The following financial measures are often monitored:

- dividend per share (DPS)
- earnings per share (EPS)
- price earnings ratio (P/E)
- share price
- market to book ratio
- return on equity (ROE)

The shareholders would like their financial standing, as measured by the above measures, to improve or be preserved. They may tolerate short-term deteriorations in the above measures if they are convinced that management's future business strategies would improve the financial position of the combined entity.

The method used to settle the purchase price also affects these measures. Each mode of financing has its advantages and disadvantages and also depends on the financial position of the acquiring company. If the acquisition is financed by issuing shares in the acquiring company (the "sellers" become shareholders of the now enlarged "purchaser"), it will result in additional shares being issued. We will then have to account for the possible dilution of earnings. Facebook paid cash for Instagram because it had huge cash resources that it could not utilise otherwise in profitable investments. Most transactions incorporate a mixture of cash and shares to settle the purchase price.

Relevant sections:

Section	Heading
12.3	<i>Financial effects of acquisition</i>
12.4	<i>Funding for mergers and acquisitions</i>

5. Summary

In this study unit, you learnt to

- determine the fair value of a business organisation or an equity shareholding using the free cash flow model
- consider the correct valuation method depending on whether the minimum, maximum or fair value is determined
- describe what is meant by synergies between different business entities and reflect on which synergies to include in a valuation when determining the **fair value** of a business organisation or an equity shareholding
- identify various forms of funding available for M&As
- discuss the effects of M&As and the method of funding based on key financial ratios

6. Self-assessment questions

After working through all the relevant sections in the textbook as well as the guidance and activities provided in this study unit, you should now be able to attempt all the self-assessment Skae et al Chapter 12 Practice questions.

PART 4 – THE TREASURY FUNCTION

INTRODUCTION

The treasury and financial control functions are two main components of financial management.

The treasury function manages the relationship between the organisation and the financial stakeholders, which include equity owners, tax authorities, banks and other providers of finance. On the other hand, the financial control function manages the relationship with other stakeholders, such as customers, suppliers and employees.

To fulfil the treasury function, you require an understanding of several areas, including how to obtain financing, how to manage working capital and cash, how foreign exchange markets work and what currency risk, interest rates and interest rate risk entail.

Note:

We have already covered the sourcing of long-term financing in part 2 on capital structure. In part 4, we will focus on short-term funding as part of working capital and cash management.

PART 4, TOPIC 6 – CASH MANAGEMENT

INTRODUCTION

In this topic, we will focus on the roles and structure of the treasury department and further aspects surrounding cash management. The treasury department has to ensure that the organisation has sufficient funds available to settle short-term commitments and where there is that excess cash, to invest it optimally. The distribution of profits to owners (dividends, in the case of a company) also plays a role in determining the amount of cash available.

Every organisation requires liquid resources/cash flow to conduct day-to-day operations. Cash flow is required to pay suppliers, salaries and wages when obligations fall due. Short-term financial strategy involves planning to ensure adequate cash flow. This is determined through sound working capital management and effective working capital financing, both which are critical to the short and long-term success of the organisation. Even a profitable organisation could fail without efficient working capital management. You learnt about most of these concepts in MAC2602. In MAC3702, we will focus on options for investing excess cash.

Shareholders (or other owners in a business) invest in the business in pursuit of an attractive return on their investment. This could be achieved by returning profits to the owners through a stable dividend policy, or by investing profits in capital projects in pursuit of higher profits and a higher share value. We will investigate the various dividend policies that businesses can pursue.

LEARNING OUTCOMES

After studying this topic, you should be able to

- discuss the roles of the treasury function
- recommend an appropriate structure for a treasury department, either as a centralised or decentralised function
- evaluate the advantages and disadvantages of operating the treasury function as a cost or profit centre
- differentiate between aggressive and conservative working capital financing policies and identify the benefits and risks of each approach

- propose suitable actions to manage the organisation's working capital and to improve cash flow
- list sources of short-term financing as well as options for investing excess short-term cash
- evaluate the impact that changes in the credit policy have on the levels of working capital and on profitability
- explain the impact that the dividend decision has on financing and investment decisions
- discuss factors to be considered when establishing a dividend policy
- discuss whether the amount of dividends received is relevant to shareholders
- describe alternative methods for distributing profits to owners

ASSUMED PRIOR KNOWLEDGE

In your MAC2602 studies, you mastered the following learning outcomes:

- defined and explained working capital, net working capital and working capital management
- discussed strategies for monitoring and managing each component of working capital
- calculated the effective cost of forfeited discounts
- prepared basic cash flow forecasts
- defined the concepts of working capital policy and the working capital cycle
- calculated the weighted cost of different financing options
- calculated the cash conversion cycle

Please refer to your second year guide if you want to refresh your knowledge.

For another perspective, you may also refer to the following sections in the prescribed Skae et al textbook:

Section	Heading
9.1	<i>Levels of working capital</i>
9.1.1	<i>Permanent working capital</i>
9.1.2	<i>Temporary working capital</i>
9.1.3	<i>Net working capital</i>
9.3.2	<i>Cash operating cycle/business cycle</i>
9.4.2	<i>Credit decisions and trade-offs</i>
9.4.3	<i>Collection policy</i>
9.5	<i>Inventory management</i>

Note:

We dealt with the preparation of cash budgets and forecasts in the budgeting topic in MAC2601. For revision purposes, we provide a question on this at the end of the study unit.

THIS TOPIC CONSISTS OF THE FOLLOWING STUDY UNIT:

STUDY UNIT	TITLE
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STUDY UNIT 8	TREASURY FUNCTION
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STUDY UNIT 8 TREASURY FUNCTION

1. Introduction

In this study unit, we will firstly focus on the role of the treasury function in managing the finances of the organisation and on the optimal structure for the treasury function under different conditions. Secondly, we will discuss effective cash and working capital management, and lastly we will consider the impact that the dividend policy (profit distribution) has on the owners and the cash resources of the organisation.

This study unit is based on **selected sections** from the following chapters in the prescribed Skae et al textbook:

- Chapter 9
- Chapter 14

2. The role of the treasury function

The key tasks of the treasury function, as presented in Figure 1, influence all three levels of decision making within the organisation:

1. **strategic** decisions, such as dividend policy, capital structure of the organisation and raising funds
2. **tactical** decisions, such as cash and risk management, including the decision to hedge currency or interest rate risk
3. **operational** decisions, such as the investment of surplus funds

The treasury function or department is responsible for the five areas of corporate finance as presented below in Figure 1.



Figure 1 The role of the treasury function

Source: Author, 2013

The treasury function could be managed as a **cost** or a **profit centre**. In a *cost centre*, managers will be rewarded for keeping financing and transaction costs within a specified budget. Alternatively, when we treat the treasury function as a *profit centre*, we recognise that revenues could be earned, for example by taking advantage of changes in exchange rates. This could motivate staff and increase their awareness of financial markets and opportunities or pitfalls that exist. However, appropriate treasury policies should be in place to guide risk-taking behaviour. We take a look at treasury policies in the next section.

3. Treasury policy

The treasury policy is consistent with the establishment of strategies and objectives for corporate finance. Every treasury department should have a treasury policy to provide guidance on investment, financing, cash management and risk management decisions. This includes the role

and responsibility of the treasury function, dealing limits and risks requiring authorisation from management.

Guidance on risks should include the following:

- risk identification and assessment methodology (refer to your MAC2602 study guide for relevant definitions)
- levels of risk that are unacceptable and require mitigating action plans
- guidelines for risk responses, or mitigating action plans to reduce risk (These include avoidance and risk reduction methods, such as internal controls or the transfer of risk)
- reporting guidelines, including guidelines for measuring treasury's performance

The treasury policy will be influenced by the decision to centralise or decentralise the treasury function, because it will influence the treasury function's decision-making ability and the execution of these decisions. We discuss this in more detail in the next section.

4. Decision to centralise the treasury function or department

Large multinational organisations with subsidiaries and associates in various countries need to decide whether or not to have a centralised treasury function. When the treasury function is centralised, it acts as a bank ensuring that cash is available for individual operating units, that excess cash is invested and that related risks are managed appropriately. The treasury department (treasurer) requires specialist skills to manage and assess the full range of available capital instruments, investments and methods to manage risk effectively. It will be beneficial if the treasurer maintains a close relationship with the organisation's bank, as they acquire knowledge of all markets and available capital instruments. Let's now investigate the advantages of a centralised versus a decentralised treasury function or department.

4.1 Advantages of a centralised treasury function

- Specialised expertise regarding financial markets, taxation and transfer pricing is concentrated, and decisions about hedging currency risk are made in the best interest of the organisation (the entire group of companies), bearing in mind that any decisions made are lawful especially if there are foreign exchange and taxation requirements.

- Centralised cash management avoids having surplus cash in some bank accounts and overdrafts in others. The treasurer will require access and visibility to all bank accounts across the group of companies.
- The organisation will have greater opportunities for short-term investment and larger volumes of cash available to negotiate or obtain higher interest accounts. (The larger the amount to be invested, the higher the potential for earning higher interest rates on the investment).
- Borrowing can be arranged in bulk at lower interest rates than for smaller individual borrowings. The group might have a better risk profile than an individual company and therefore obtain lower interest rates on loans and overdrafts. The group might also be able to offer better security for loans than individual companies.
- It will be more effective to manage foreign currency risk in a group of companies. A central function can better identify opportunities for interest rate swaps, where it is possible to match the income of one operating unit in a specific currency with the expenditure of another operating unit in the same currency. For example, one business unit might export goods in dollars, while another might import equipment payable in dollars. These currency streams can be matched to eliminate the need for currency contracts and the accompanying costs.
- Organisations will often hold a capital reserve aligned with the risk management policy for precautionary purposes. The reserve for a group of companies could be smaller than when held separately by numerous individual operating units.
- Standardised procedures and risk management strategies could be better introduced and monitored.

(Adapted from CIMA)

4.2 Advantages of a decentralised treasury function

- A decentralised function will be more responsive to the needs of individual operating units.
- Sources of finance can be matched to local assets.
- The managers of operating units can make quicker, more effective decisions, as they will have a closer relationship with the decentralised function (their "own" treasurer) without delays due to time differences, procedures etc.
- Each region might have distinct tax and regulatory requirements, different financing conditions and distinct currency issues which require the local knowledge of a decentralised treasury function.

(Adapted from CIMA)

5. Working capital management policy and financing

Working capital, also known as short-term financial management, refers to the management of the current assets and liabilities as well as the way in which related functions are performed within the organisation and the way in which working capital is financed. These are some of the key functions of the financial managers of business units, as they impact the available cash in the organisation directly. The financial managers of the business units will work closely with the treasurer in this regard.

The working capital cycle can be depicted as follows:

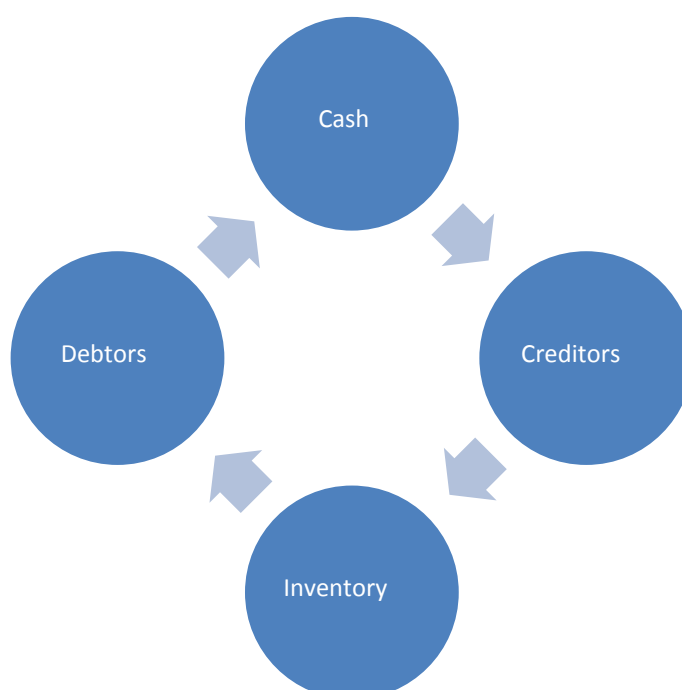


Figure 2 Working capital cycle

Source: Author, 2013

Working capital management requires smart financial planning, and most organisations will have target levels for current assets and current ratios. (Please refer to study unit 1 for ratio analysis).

These target levels will be defined in a working capital management policy. As discussed in MAC2602, an organisation may adopt a **conservative** policy (describing working capital target levels) whereby the organisation holds high levels of working capital, which could include generous payment terms for debtors to increase demand or maintaining high levels of inventory to ensure availability. Alternatively, the organisation may adopt an **aggressive** policy, whereby debt is collected quickly, inventory is limited and creditor payments are delayed to invest surplus cash and reduce financing costs.

Various factors influence the target levels of working capital, including trade discounts received and provided, inventory holding cost, inflation rates, industry requirements, the seasonality of operations as well as demand and changes in turnover.

Relevant sections:

Section	Heading
9.1	<i>Levels of working capital</i>
9.2	<i>Hedging or matching finance</i>

The working capital policy (including the target levels of working capital) must balance the return generated from the investment in working capital with the associated risks. You can determine whether the working capital is managed effectively by analysing the net working capital. An **overinvestment** in current assets is not cost effective, as it may earn an inadequate return on investment and the inventory holding cost could be exorbitant.

Indications of an overinvestment in current assets include the following:

- significant levels of working capital
- low inventory turnover ratios
- poor liquidity ratios
- credit repayment terms that are shorter than debtor collection terms
- unusually high bank overdrafts

In the same way, an **underinvestment** in current assets could have a negative impact and result in out-of-stock situations (giving rise to opportunity costs and customer dissatisfaction) or an inability to pay suppliers, salaries and wages when these payments are due.

A lack of cash or liquidity is also referred to as **overtrading**. Signs of this include rapid expansion coupled with deteriorating current and quick (or acid-test) ratios. This could threaten the ability of the organisation to continue as a going concern. Therefore, the profitability of an organisation is no guarantee for success when its working capital is managed poorly.

In your AIN1501 and AIN2601 modules, you also learnt that IT systems often play a crucial part in working capital management. Examples of these include the following:

- enterprise resource planning (ERP) systems, for determining inventory levels, managing supplier and production orders, etc.
- customer relationship management (CRM) systems, for managing customer orders etc.
- spreadsheet software to assist with various calculations and forecasts

- management information systems (MISs) for generating reports and graphs
- internet tools and cloud-based solutions for communicating with customers and suppliers and enabling e-commerce

Note:

The use of long-term financing options to finance working capital (conservative approach) could limit the organisation's ability to gain finance for more profitable growth opportunities.

6. Cash management

We will now focus on the cash management function. Cash can be regarded as the lifeblood of the organisation. It is important not to have too much cash on hand, since the interest earned on cash is low. However, there should also not be a cash shortage, as borrowing in excess of the available overdraft or at short notice incurs higher interest charges. The treasury function relies heavily on accurate forecasts from the financial managers of the business unit.

When the treasurer receives the various cash flow forecasts from the business units (BUs), it is consolidated, as the shortfall (need for overdraft) of one BU can be met by the surplus cash of another BU. Consolidating the cash requirements saves transaction and borrowing costs. Based on the net cash requirement of the business, the treasurer will determine:

- if the current overdraft facility is sufficient
- if additional short-term borrowing is required
- if excess cash can be invested

The cash requirement is also evaluated in terms of timelines so that amounts can be borrowed or invested for the required periods.

Examples of short-term finance and investment options include the following:

Short-term finance	Short-term investments
overdraft	call account
short-term loan	Short term notice deposits for example 32-day notice deposits
commercial paper	treasury bills
	bankers' acceptance (BA)
	negotiable certificates of deposit (NCD)

Note:

In MAC2601, compiling the cash flow forecast is part of the budgeting topic.

Relevant section:

Section	Heading
9.3	<i>Cash management (see Note for detail)</i>

Note:

Section	Heading
9.3.5	<i>The Baumol model for cash management.</i>
9.3.6	<i>The Miller-Orr model</i>

These two sections should serve **as background** to help you understand how organisations go about determining how much cash to keep in their bank account and when to liquidate short-term investments or to invest excess cash. You do **NOT** need to know how the formulae work or how to apply them.

Other strategies to reduce the duration of the cash flow cycle (i.e. ways to improve cash flow) could include the following:

- entering into sale and lease back agreements
- employing cost cutting measures
- selling assets that are not part of the core operations or are not earning sufficient returns
- improving financial control (could include tightening of the budget and more rigorous comparisons of budget versus actual figures)

7. The impact of the credit policy on working capital and profitability

The management of accounts receivable and payable was covered in depth in MAC2602. Inventory management is covered in MAC2601 and MAC3701. In this section, we want to focus once more on the management of accounts receivable, as it has a huge impact on the cash cycle. The textbook provides some revision of concepts already dealt with as well as some additional insights, including debtors' factoring as a source of short-term financing.

Relevant section:

Section	Heading	Inclusions
9.4	<i>Debtors' management</i>	<i>9.4.4 Evaluating credit on a Net Present Value (NPV) approach</i>

A change in the credit policy of the organisation has significant long-term implications for the level of accounts receivable (debtors) that should be funded. Traditionally, the **holding cost** of investment in debtors was calculated using the overdraft rate. However, modern thinking suggests that if a conservative working capital financing policy is favoured (part of the working capital are deemed "permanent" and are funded by the organisation's long-term optimal mix of equity and debt finance), then the **holding cost** of the investment in debtors should be measured by the weighted average cost of capital (WACC), as in the case of any other investment decision. Other authors propose that an appropriate rate would be lower than WACC, as the risk attached to the net current assets are less than that attached to the other assets of the business.

Note:

Your textbook follows the WACC approach. However, you might find that other questions or textbooks still use the overdraft rate. However, we calculate the effect that a change in credit policy has on cash flow in the same way, irrespective of the rate that is used to calculate the holding cost. Simply use the financing rate provided in the question.

MAC3701 will use the incremental approach to evaluate the impact of a change in credit policy. In you post-graduate modules you will also encounter other methods, such as the NPV approach.

Enrichment activity

Visit the following websites and read up on the companies' credit terms and policies:

www.wetherlys.co.za/page/credit

www.morkels.co.za (Choose the "Credit" tab).

www.coricraft.co.za (Choose the "Cori terms" tab, followed by the "Payment terms" tab).

8. The dividend decision

Owners require a return on their investment, whilst managers are more concerned with the on-going financing of the organisation. Shareholder value (the return) is increased by the dividends shareholders receive and capital growth on the value of their shares over time. Dividends (or distributions of profits to owners) are paid from surplus cash, which has a direct influence on the amount of money available to finance investment. Companies must strike a balance between providing shareholders with a satisfactory dividend return and investing retained earnings for future growth.

Note:

From now on we will use the terms "dividends" and "shareholders".

The benefits of using retained earnings as a source of finance include the following:

- Funds are readily available.
- There are no issue costs for new shares or debt instruments.
- There is no risk of a change in control as with a new share issue.
- It is a good option for organisations that will struggle to obtain more debt financing or may default on debt repayments due to excessive levels of debt.

Study the chapter 14 in the prescribed Skae et al textbook as well as the further guidance provided below. Then attempt the activities.

Miller and Modigliani (discussed in part 2 on capital structure) believe that the dividend decision is irrelevant in perfect capital markets, as investors are indifferent to returns in the form of dividends or capital gains. However, as discussed before, perfect capital markets assume no taxes, no transaction costs and that perfect information are available to all shareholders.

Arguments against the Miller and Modigliani theory therefore include the following:

- Taxation rates are different for dividends and capital gains.
- Organisations will want to limit dividends in periods of financial constraint.
- Due to imperfect markets, the share price may be lower than expected, and shareholders will then want dividends to realise a return on investment.
- Transaction costs on the sale of shares affect the decision to realise capital gains.

- Perfect information is not always available to all shareholders, for example, they are not aware of future investment opportunities or planned actions by competitors.
- Most shareholders prefer a constant dividend because they perceive it to be less risky.

Setting a dividend policy is a complex matter which is affected by various factors, including statutory requirements, shareholder preferences, the cash position of the organisation and the effect of taxation. The "bird in the hand" theory also predicts that shareholders will usually require a higher rate of return from companies with a fluctuating dividend policy, as they perceive them to be more risky. In other words, assuming that all other things are equal, companies with a stable dividend policy will usually have a lower cost of capital relative to those with a fluctuating dividend policy.

Activity 8.1

Attempt question 14-1 to 14-2 at the end of chapter 14 in the prescribed Skae et al textbook.

Enrichment activity

Visit the websites of five JSE-listed companies of your choice and read up on their dividend policy and dividend payment history.

Alternatively, you may also visit the websites of the three companies listed below:

www.sasol.com (Choose the "Investor Centre" tab).

www.exxaro.com (Choose the "Investor" tab).

www.sabmiller.com (Choose the "Investors" tab).

9. Summary

In this study unit, you learnt to

- discuss the roles of the treasury function
- recommend an appropriate structure for a treasury department, either as a centralised or a decentralised function
- evaluate the advantages and disadvantages of operating the treasury function as a cost or profit centre
- differentiate between aggressive and conservative working capital financing policies and identify the benefits and risks of each approach

- propose suitable actions to manage the organisation's working capital and improve cash flow
- list sources of short-term financing as well as options for investing short-term excess cash resources
- evaluate the impact that changes in the credit policy will have on the levels of working capital and on profitability
- explain the impact of the dividend decision on financing and investment decisions
- discuss factors to be considered when establishing a dividend policy
- discuss whether the amount of dividends received is relevant to shareholders
- describe alternative methods for distributing profits to owners

In the next topic, we will focus on the role of the treasury function in managing foreign exchange and interest rate risks.

PART 4, TOPIC 7 – CURRENCY AND INTEREST RATE RISK MANAGEMENT

INTRODUCTION

In this topic, we will focus on the role of treasury in managing the organisation's currency and interest rate risks through basic hedging tools. The treasury manager needs to understand what factors affect the rate of exchange and interest rates.

LEARNING OUTCOMES

After working through this topic, you should be able to:

- describe the basic workings of foreign exchange rates and interest rates
- identify risks related to foreign exchange rates, interest rates, duration choices, refinancing and liquidity
- address risks related to foreign exchange, interest rates, duration choices, refinancing and liquidity using basic instruments and techniques

ASSUMED PRIOR KNOWLEDGE

We did not cover any of the learning outcomes for this topic in previous modules. Therefore, please pay careful attention when working through the contents of this topic.

THIS TOPIC CONSISTS OF THE FOLLOWING STUDY UNIT:

STUDY UNIT	TITLE
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STUDY UNIT 9	MANAGING CURRENCY AND INTEREST RATE RISKS
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STUDY UNIT 9 MANAGING CURRENCY AND INTEREST RATE RISKS

1. Introduction

This study unit will focus on the role of the treasury function in managing and understanding the working of foreign exchange markets, currency risk as well as interest rates and interest rate risk.

This study unit is based on **selected sections** from the following chapters of the prescribed Skae et al textbook:

- Chapter 15
- Chapter 16

2. Currency risk and calculating exchange rates

When an organisation does a trade transaction with a supplier in another country, for example it imports a product or services; it will have to acquire foreign currency of the supplier's country by converting rand at the bank to settle the purchase transaction. On the other hand, if the organisation sells to a customer in a foreign country, for example it exports a product or services, it will have to sell the foreign currency proceeds they receive to the bank and receive rand in exchange. The foreign currency exchange rate is the conversion rate of currencies and depends on the supply and demand of the currency.

In this section, we will define currency risk, discuss the categories of currency risk and see how currencies are quoted in different markets.

Relevant sections:

Section	Heading
15.1	<i>Currency risk defined</i>
15.2	<i>Different currency quotes in the currency market</i>

Activity 9.1

A local furniture store, Shaka (Pty) Ltd, imports furniture from an exclusive manufacturer in Europe. The last order was placed on 30 July 20X6 for furniture to the value of €250 000. The shipping terms are free on board (FOB), and the furniture was loaded on 6 August 20X6. The payments terms are 30 days from shipment date, and Shaka (Pty) Ltd makes use of forward exchange contracts (FEC) to hedge against fluctuations in the foreign currency exchange rate.

The following rates are available:

Date	Bank selling rate	Bank buying rate
30 July 20X6	15,0097	15,9916
6 August 20X6	15,0765	15,0605
5 September 20X6	15,5570	15,5411
Forward rate (30 days) on 6 August 20X6	15,1582	

REQUIRED

- Calculate the rand amount due on the date of the transaction.
- Assume that no forward cover was taken out to hedge the exchange rate risk. Calculate the foreign currency gain or loss between the transaction date and the payment date.
- Determine if it would have been to the benefit of the company had they taken out the forward cover.
- Calculate the mid-rate on 5 September 20X6.

Solution to activity 9.1

- The transaction date is 6 August, because the shipping terms are FOB. Therefore, the rand amount is determined by means of the bank selling rate on 6 August 20X6 (Shaka (Pty) Ltd is buying currency (EURO) from the bank and therefore the correct rate to use is the bank selling rate).

$$\begin{aligned}\text{Rand amount on date of transaction} &= \text{€}250\,000 \times \text{R}15,0765 \\ &= \text{R}3\,769\,125\end{aligned}$$

$$\begin{aligned}\text{b. Foreign currency gain / loss} &= \text{€}250\,000 \times (\text{R}15,0765 - \text{R}15,5570) \\ &= \text{R}120\,125 \text{ loss (the exchange rate deteriorated i.e.} \\ &\quad \text{the rand was trading weaker against the EURO)}\end{aligned}$$

$$\begin{aligned}\text{c. Effect of forward cover} &= \text{€}250\,000 \times (\text{R}15,5570 - \text{R}15,1582) \\ &= \text{R}99\,700 \text{ gain}\end{aligned}$$

Yes, it would have been to the benefit of the company to take out the forward cover, as the spot exchange rate on 5 September 20X6 (R15,5570) is higher than the forward exchange contract (FEC) rate (R15,1582).

$$\begin{aligned}\text{d. Mid-rate} &= \frac{\text{buying rate} + \text{selling rate}}{2} \\ &= \frac{15,5570 + 15,5411}{2} \\ &= \text{R}15,5491 \text{ (rounded to nearest fourth decimal)}\end{aligned}$$

3. Theories and factors determining exchange rates

There is a direct relationship between currency and interest rates (called interest rate parity) as well as between currency and inflation rates (called purchase power parity).

Interest rates and the associated risks of a country influence direct foreign investment into the country. This, in turn, drives the supply and demand for a currency and therefore its value. **Interest rate parity** is usually used to calculate exchange rates expected in the **short term**, while **purchase power parity** is used to calculate expected exchange rates in the **medium to long term**.

Inflation affects the future value of any investment and therefore, it either drives or discourages investment in a specific country. The effect that inflation rate differences between two countries have on their currency exchange rates is called purchase power parity.

Relevant sections:

Section	Heading
15.3	<i>Theories for determining forward exchange rates</i>
15.4	<i>Factors influencing exchange rates</i>

Activity 9.2

The following information is available in the South African currency market on 5 September 20X5.

	ZAR/£1
Spot rate	R16,0404
South African (borrowing) interest rate	8,5 % per annum
United Kingdom (borrowing) interest rate	1,5 % per annum
South African inflation rate	6,3% per annum
United Kingdom inflation rate	2,8% per annum

Assume there are 360 days in a year.

REQUIRED

- Use the interest rate parity principle to determine the 60-day forward rate (round your answer to the nearest four decimals).
- Use the purchasing power parity theory to determine the forward rate for 5 September 20X7 (round your answer to the nearest four decimals).

Solution to activity 9.2

- Forward rate by means of the interest rate parity principle

$$\begin{aligned}\text{Forward rate} &= \text{spot rate} \times \frac{1 + \text{interest rate in reference currency}}{1 + \text{interest rate in base currency}} \\ &= \text{R16,0404} \times \frac{1 + (0,085 \times \frac{60}{360})}{1 + (0,015 \times \frac{60}{360})} \\ &= \text{R16,0404} \times \frac{1,0142}{1,0025} \\ &= \text{R16,2271}\end{aligned}$$

b. Forward rate by means of the purchasing power parity theory

$$\begin{aligned}
 \text{Forward rate} &= \text{spot rate} \times \frac{(1 + \text{inflation rate in reference currency})^2}{(1 + \text{inflation rate in reference currency})^2} \\
 &= R16,0404 \times \frac{(1,063)^2}{(1,028)^2} \\
 &= R16,0404 \times 1,0693 \\
 &= R17,1512
 \end{aligned}$$

Note:

Remember to adjust the interest or inflation rates for the period under consideration.

Online enrichment activity

Search the internet for the "Big Mac index", which considers the price of a McDonald's hamburger between different countries as an informal method of measuring purchase power parity. This term may be protected by trademark. Remember that the index is merely an unofficial measure.

4. Hedging currency risk

An organisation will use hedging techniques to offset the risk of exposure to adverse movements in currency exchange. These hedging techniques include:

- money market hedges
- forward exchange contracts (FECs)
- foreign exchange futures contracts
- foreign exchange option contracts
- currency swaps

For the purposes of MAC3702, we will only focus on the first two hedging techniques. The others will be covered in later MAC modules.

Relevant sections:

Section	Heading
15.5	<i>Hedging of currency risk</i>
15.6	<i>Money-market hedges</i>
15.7	<i>Using forward exchange contracts (FECs) to hedge currency risk</i>

Activity 9.3

Ithunga (Pty) Ltd imported tiles from an overseas supplier. On 10 June 20X3 Ithunga (Pty) Ltd received an invoice to the amount of \$250 000 payable on 18 September 20X3.

The following information is available:

	ZAR/USD
Spot rate (bank's selling rate in South Africa) on 10 June 20X3	R9,947
South African borrowing rate (for a 90-day borrowing period)	8,5% per annum
South African investment rate (for a 90-day borrowing period)	4,76% per annum
American borrowing rate (for a 90-day borrowing period)	3,25% per annum
American investment rate (for a 90-day borrowing period)	0,2733% (3 month maturity)

Assume there are 360 days in a year.

Ithunga (Pty) Ltd makes use of money market hedging to manage the risk related to foreign exchange rate fluctuations. Interest on borrowings and investments is determined and added to the borrowing/investment at the end of the term.

REQUIRED

Determine the following:

- the rand amount of the payment on 18 September 20X3
- the effective exchange rate applicable to the transaction on 18 September 20X3

Solution to activity 9.3**a. Rand amount payable**Rationale

Ithunga needs to borrow funds locally in rand on 10 June 20X3, convert it immediately to US\$ and invest the converted proceeds in the United States to ensure that enough funds are available for the payment of \$250 000 on 18 September 20X3. Therefore, we must determine how much Ithunga needs to invest on 10 June 20X3, based on a return of 0,2733% for 90 days, to ensure that \$250 000 is available on 18 September 20X3.

Use the following inputs for your calculator to calculate the present value (PV):

$$FV = 250\,000$$

$$n = 1 \text{ (interest added at end of period)}$$

$$i = 0,2733\% \text{ (maturity in 3 months, therefore no need to do a pro rata calculation of the rate)}$$

$$\text{COMP PV} = 249\,319$$

Now that you have calculated the PV of the investment required, we convert the \$249 319 to rands on 10 June 20X3 by means of the spot rate for that day:

$$\text{Rand amount} = \text{PV value on 10 June 20X3} \times \text{spot rate on 10 June 20X3}$$

$$= \$249\,319 \times R9,947$$

$$= R2\,479\,976$$

Therefore, Ithunga needs to borrow R2 479 976 from a local bank on 10 June 20X3 and convert it immediately to US\$ at spot rate and invest abroad.

Next, we need to determine what the total amount of the South African borrowing will be on 18 September 20X3. Use the following inputs for your calculator to calculate the future value (FV):

$$PV = 2\,479\,976$$

$$n = 1 \text{ (interest added at end of period)}$$

$$i = 8,5\% \times 90/360 \text{ (pro rata for 90 days)}$$

$$\text{COMP FV} = 2\,532\,675$$

Therefore, the rand amount was calculated as R2 532 675 on 18 September 20X3.

b. Effective rate

The effective exchange rate "manufactured" on 18 September 20X3 is:

$$\text{R2 532 675} / \$250\,000 = \text{R10,13} / \$1$$

Note:

You should pay careful attention to the periods for which the interest rates are provided. Even though the organisation in our example only wants to borrow or invest for 90 days, the interest rate may be provided on an annual basis or for another period (like the three months provided for the American investment rate in our example). Remember to work out a pro rata interest rate if necessary.

5. Interest rates and interest rate risk

Interest rates measure the cost of borrowings, influence currency exchange rates and provide a guideline for the returns required by investors. You need to be aware of the factors influencing interest rates and the techniques that could be used to hedge or protect the organisation against changes in interest rates.

Relevant sections

Section	Heading
16.1	<i>Interest rate risk defined</i>
16.2	<i>The interest rate mechanism and the different interest rate base rates</i>
16.3	<i>The capital, debt and money markets</i>
16.4	<i>The level of interest rates in the financial markets</i>

Online enrichment activity

- Visit the website of the SA Reserve Bank at <http://www.resbank.co.za/Pages/default.aspx> and establish what the current repo rate is.

- b. Visit the website of two commercial banks and compare their prime overdraft rates as well as the rates they offer for different products.

6. Hedging interest rate risk

As discussed in part 2 on capital structure, debt financing should constitute a major part of the capital structure of an organisation. As such, the interest payable will usually be a sizable amount on the statement of comprehensive income and the statement of cash flows. You should be aware of the various hedging techniques available to reduce interest rate risk, which include the following:

- trading in treasury bills, bankers' acceptances and negotiable certificates of deposit
- forward rate agreements
- interest rate future contracts
- interest rate option contracts
- interest rate swap agreements

For the purposes of MAC3702, we will only focus on the first two hedging techniques for managing interest rate risk. The others will be covered in later MAC modules.

Relevant sections:

Section	Heading
16.5	<i>Treasury Bills</i>
16.6	<i>Bankers' Acceptances</i>
16.7	<i>Negotiable Certificates of Deposit</i>
16.8	<i>Forward Rate Agreements</i>

Notes:

1. It is important that you understand the time value of money concepts underlying the valuation of money market instruments. You should also know how to operate your financial calculator to calculate the effective yield for the different cash flows. If in doubt, refer back to your MAC2602 study guide for the calculator instructions.
2. We should manage interest rate risks for borrowings as well as investments. In topic 6 on working capital, we discussed treasury bills, bankers' acceptances and negotiable certificates of deposit as short-term investment options. The related sections in the textbook covered

under this heading explore how the treasurer should weigh his/her options depending on the movement in the interest rate.

Activity 9.4

Thabo has decided to invest his performance bonus of R300 000 in treasury bills. His offer price of R96,25 (per R100 nominal value) was successful and accepted on 2 June 20X6.

Market discount rates over the period of maturity were as follows:

02/06/20X6	15,15%
02/07/20X6	14,75%
02/08/20X6	14,15%

REQUIRED

Advise Thabo whether he should hold his investment until maturity, or whether he should trade before maturity. Assume there are 365 days in the year.

Solution to activity 9.4

Investment held until maturity (1 September 20X6 – 91 days)

$$\begin{aligned}\text{Price paid for treasury bills} &= \text{R300 000} \times 0,9625 \\ &= \text{R288 750}\end{aligned}$$

$$\begin{aligned}\text{Value of treasury bills} \\ \text{on maturity} &= \text{R300 000}\end{aligned}$$

$$\text{Discount (interest for the period)} = \text{R11 250}$$

$$\begin{aligned}\text{Effective yield} &= \frac{\text{R11 250}}{\text{R288 750}} \times \frac{365}{91} \times 100 \\ &= 15,63\%\end{aligned}$$

If sold after **30** days (2 July 20X6) at a discount rate of 14,75%



Purchase price = R288 750

Selling price = R300 000 – (R300 000 x 14,75% x **61**/365)

= R292 605

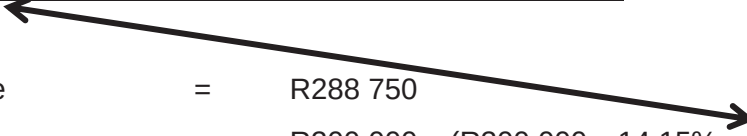
Interest for the period = R292 605 – R288 750

= R3 855

Yield for the period held = $\frac{R3\ 855}{R288\ 750} \times \frac{365}{30} \times 100$

= 16,24%

If sold after **61** days (2 Aug 20X6) at a discount rate of 14,15%



Purchase price = R288 750

Selling price = R300 000 – (R300 000 x 14,15% x **30**/365)

= R296 511

Interest for the period = R296 511 – R288 750

= R7 761

Yield for the period held = $\frac{R7\ 761}{R288\ 750} \times \frac{365}{61} \times 100$

= 16,08%

Conclusion:

Thabo should trade his treasury bills on 02/07/20X6 as this gives the highest yield of 16,24%.

Note:

If Thabo sells his treasury bills before maturity, the buyer will earn the interest for the **remainder** of the period, and that will become the new owner's "discount". Thabo therefore only earns interest for the period that he has held the investment. The period for which he has held the investment, plus the period remaining (used to calculate the selling price) should always add up to 91 days.

7. Summary

In this study unit, you learnt to:

- describe the basic workings of foreign exchange rates and interest rates
- identify risks related to foreign exchange rates, interest rates, duration choices, refinancing and liquidity
- address risks related to foreign exchange, interest rates, duration choices, refinancing and liquidity using basic instruments and techniques

8. Self-assessment question

After working through all the relevant sections in the textbook, guidance and activities provided in this study unit, you should now be able to attempt the following self-assessment questions.

QUESTION 1

Explain the benefits of internal hedging methods for managing foreign currency risk over external methods involving financial instruments.

SOLUTION TO QUESTION 1

Internal hedging arrangements are generally less expensive than external ones. The purchase of financial instruments generally involves professional fees and commissions.

In many circumstances, internal hedging arrangements can cost little or nothing to organise. For example, a company operating in the Euro zone that is forced to accept payments for sales in ZAR may hedge its exposure by importing materials that are priced in rand. Any devaluation of the rand will reduce the revenues, but also the costs.

Offsetting or matching currencies is a simple concept, which also makes internal hedging easier to understand.

Many financial instruments are extremely complicated and may be sold by financial institutions that have little incentive to explain the risks and rewards clearly to their non-expert clients.

Internal hedging can sometimes be used to ease economic exposure, which cannot always be achieved by means of financial instruments. Because costs and revenues will most likely move in the same direction, there is less risk of being undercut by an overseas competitor.

Financial instruments can be invaluable in dealing with very specific short-term exposures, such as a large receivable denominated in another currency, but derivatives cannot adequately deal with long-term fluctuations in costs or revenues.

(CIMA adapted)

QUESTION 2

Answer practice questions 15-1 to 15-4 at the end of chapter 15 in the prescribed Skae et al textbook.

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