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Operational Level

Financial Management (FM2.3) Workbook

Institute of Certified Public Accountants of Rwanda
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Acknowledgement.

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Overview of the Module

CPA level	Operational level
Title	Financial Management
Guided learning hours	120
Exam length	3 hrs

Introduction to the Module

The syllabus aims to provide an insight into the financial management of an organisation. The main focus of the syllabus is a profit-making business, though many of the areas considered will also apply to government-owned and other not-for-profit organisations.

The syllabus is broken down into six key areas, covering seven key capabilities.

The syllabus starts with a consideration of an organisation's strategic and financial objectives, for both for-profit and not-for-profit entities. Objectives are set to meet the needs of the different stakeholders in the organisation. This syllabus identifies these needs and considers how management prioritises different stakeholder groups and how this differs between private and public sector.

It is important to understand that the organisation should not be considered in isolation, so the syllabus considers the economic environment in which the business operates, the tools and policies that governments use to manage that economy and the impact that this has on the organisation.

The syllabus introduces the three core areas that the financial manager must address: the investment decision, the finance decision, and the dividend decision.

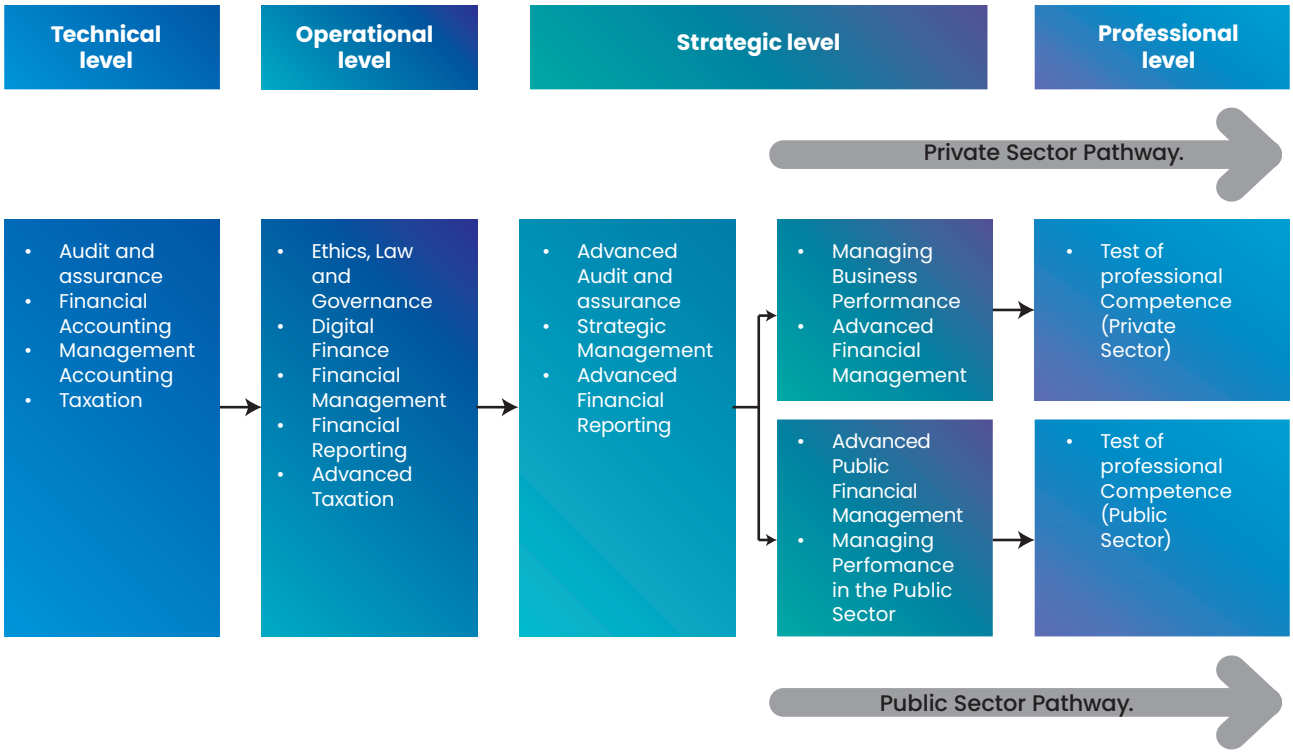
The investment decision considers the potential investment opportunities that are available to the organisation, and this syllabus considers some of the techniques that can be used to assess the financial viability of potential opportunities. The techniques themselves are also appraised so that their limitations are reflected in the decision-making process. This financial analysis is then combined with other non-financial information, enabling recommendations on suitable investments.

The syllabus then turns to the sources of finance available to an organisation. The different sources are considered on a practical and theoretical level and assessed for their suitability, together with the implications for stakeholders. The cost of the different types of finance is determined, along with the organisation's overall cost of capital.

The syllabus then considers the investment in, and funding of, the working capital in an organisation. The practical and theoretical aspects of managing working capital are evaluated.

Finally, the syllabus considers whether to use the returns generated from investments to fund further projects or to return surplus cash to the shareholders as a dividend. The practical and theoretical arguments over whether a dividend should be paid are also addressed.

This module is one of five completed at the operational level of the CPA.



Key competencies

A. Explain the three key elements of a financial strategy and how this differs between for-profit and not-for-profit entities.

B. Explain how governments can use different policies to achieve macro-economic objectives and the impact this has on different market structures.

C. Apply investment appraisal techniques to evaluate potential projects.

D. Evaluate the different sources of finance available to an organisation.

E. Calculate an organisation's cost of capital.

F. Discuss the importance of working capital management and advise on different policies.

G. Appraise whether a dividend should be paid, considering both practical and theoretical arguments.

Unit A: Finance strategy

Learning outcomes

A.1. For-profit organisations

A.2. Not-for-profit organisations

A.3. Stakeholders

A.4. Financial manager's role

A.5. Short-term and long-term financial strategy

Introduction to Unit A

In this unit, we will begin by examining the role of the financial manager in both for-profit and not-for-profit organisations, focusing on the key factors they must consider when making decisions. We will explore the organisation's objectives and discuss how these can be translated into Key Performance Indicators (KPIs) that align with the ultimate goal of maximising shareholder wealth. We will also consider how the financial manager can balance the three key decisions that affect this wealth and how each decision can either contribute to or destroy value for the shareholder.

While shareholders are the primary focus in for-profit organisations, the organisation also has other stakeholders whose interests need to be considered. We will analyse potential conflicts between the objectives of different stakeholders and the overarching goal, and how effective corporate governance can help manage these conflicts.

While the primary aim of for-profit organisations is to generate profits, not-for-profit organisations have different objectives. In this unit, we will also examine the unique goals of not-for-profit organisations and discuss strategies for managing them effectively.

A1. For-profit organisations

1.1 Objectives of the Business

The primary objective of a business is to create value for its stakeholders whilst maintaining long-term sustainability. This can be broken down into several key components. In this section we are going to explore how the financial manager can work to satisfy these objectives while looking at how we can measure how well these objectives are being met.

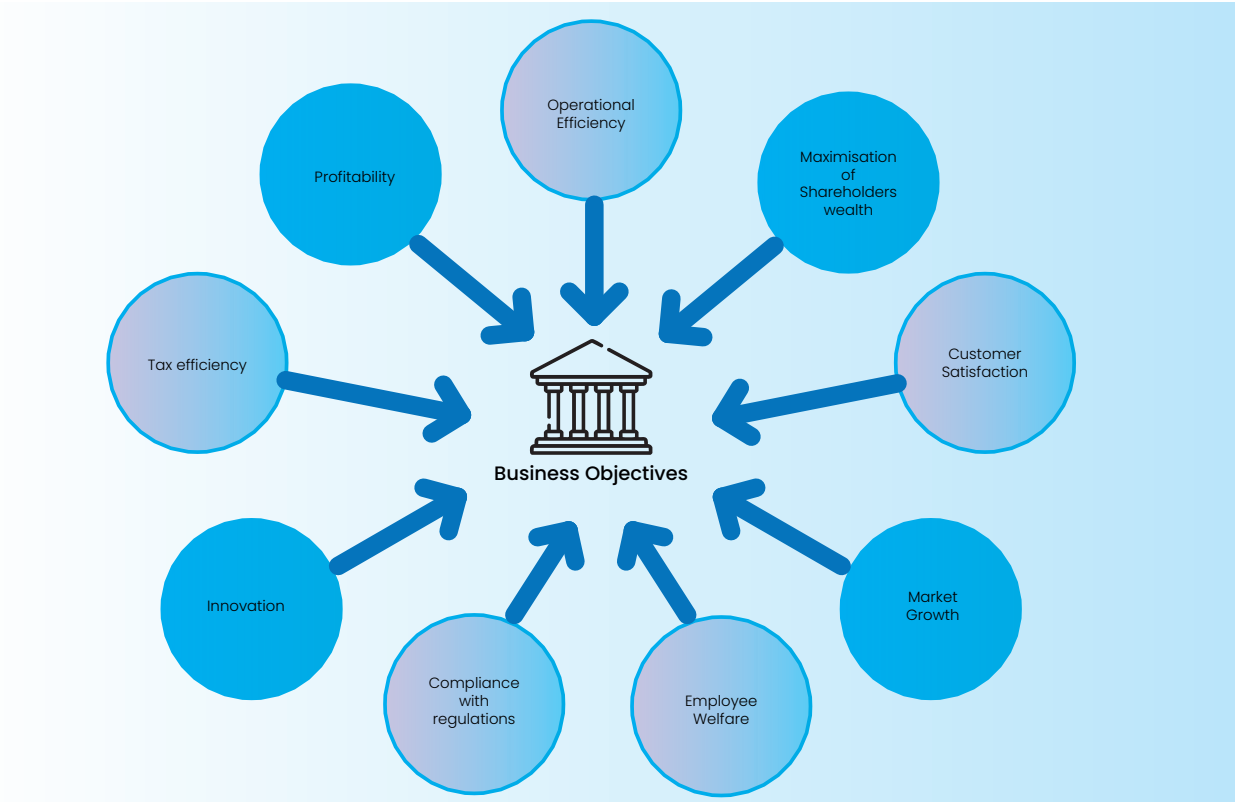


Figure 1: For Profit business objectives

The figure above shows some of the main business objectives. We will focus on maximisation of **shareholders wealth, profitability, innovation and market growth** in more detail because these are the ones financial managers will mainly seek to satisfy the most.

1.2 Objectives of Financial Management

Financial management primarily focuses on achieving the organisation's key objectives through the effective **utilisation of financial resources.** Finance managers are responsible for **acquiring funds** and deploying them efficiently to **maximise shareholder wealth.** This requires expertise in **securing finance, investing** it wisely, **and generating profits** in a **tax-efficient manner.** Leveraging technology and innovative solutions can further enhance the effectiveness of these processes, enabling finance managers to meet their goals more efficiently.

1.2.1 Impact of tax, technology and other factors

As finance managers we need to consider how well we can leverage technology, tax and other factors to meet these goals. For example, the use of finance borrowing can help with reducing the tax that we pay since we deduct interest before we pay tax. This tax efficiency can help ensure that we maximise the benefit of financing.

The use of big data can also enhance business objectives by providing valuable insights for decision-making. It improves customer personalisation, operational efficiency, risk management, product development, and market intelligence. By analysing large datasets, businesses can optimise financial performance, human resources, and regulatory compliance. Effective use of big data requires robust infrastructure, data governance, and a data-driven culture to gain competitive advantage and drive innovation.

1.3 Profit Maximisation

Profit is often viewed as the main business objective and a measure of success, with shareholders expecting high returns. However, its annual measurement presents several financial management issues which include encouraging short-term thinking and ignoring future potential and innovation capacity. It is important to consider the differences in short term and long-term profits.

1.3.1 Short Term vs Long Term profits

A long-term focus means that we can seek to achieve objectives in the long term, and this enhances the wealth of the shareholders through better decisions being made. Key differences between short term profits and long-term profits are highlighted below.

Aspect	Short terms profits	Long term profits
Years	Less than or within a year.	Over multiple years.
Focus	Immediate financial gains.	Sustainable growth and value creation.
Investment approach	Quick returns, cost-cutting.	Strategic investments, R&D, infrastructure.
Risk tolerance	Often higher for immediate gains.	Balanced, considering long-term risks.
Financial reporting	Easier to manipulate for short-term gains.	Reflects true financial health over time.
Innovation emphasis	Less likely to invest in innovation.	More likely to invest in innovation.

1.3.2 Issues with using profit as a measure

Profit has several significant drawbacks as a measure of business performance. As a historic figure, it provides no long-term focus, failing to capture a company's future potential or strategic positioning. This backward-looking nature means profit does not effectively measure a business's capacity for growth or innovation. Moreover, profit figures do not reflect liquidity risk, potentially masking cash flow issues that could threaten a company's survival. Another concerning aspect is that profit can be manipulated through various accounting techniques, potentially misleading stakeholders about the true financial health of the business. These limitations underscore the importance of considering a broader range of financial and non-financial indicators when assessing a company's overall performance and prospects

1.4 Wealth Maximisation

1.4.1 A focus on shareholder return instead of profit

Given the drawbacks of profit. A better focus for financial management should be maximisation of shareholders wealth. There are two ways in which a shareholder can maximise their wealth; 1. receiving a dividend and 2. An increase in the market value of the shares.

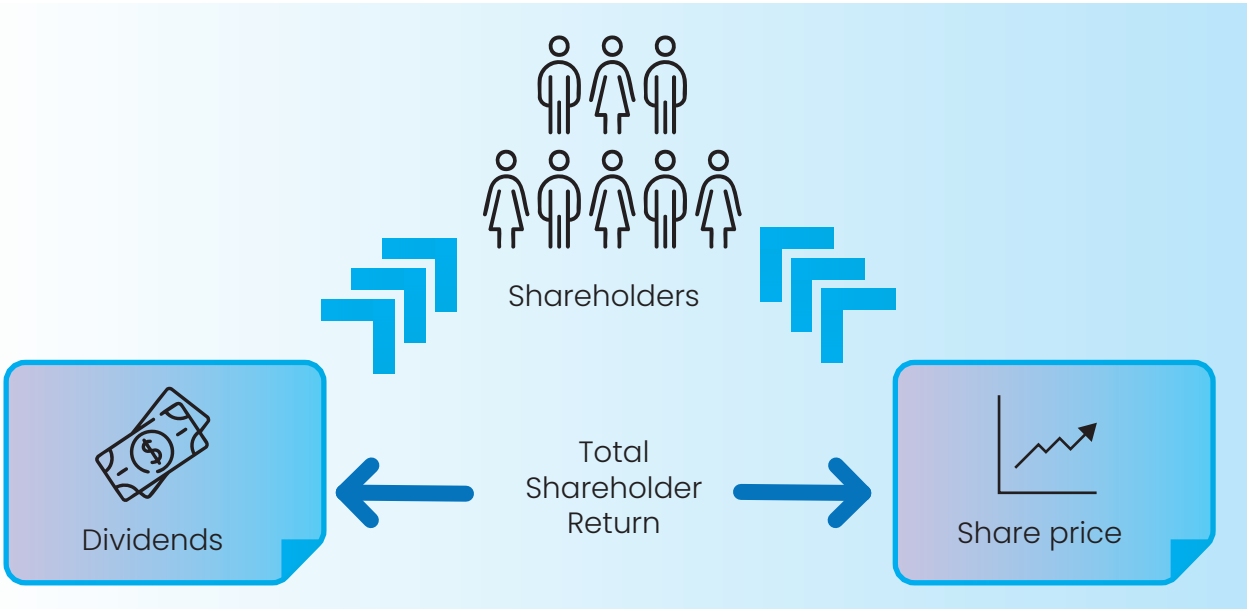


Figure 2: Illustration of Total Shareholder Return (TSR)

1.4.2 Maximisation of Shareholders Wealth

To maximise the wealth of the shareholder financial managers will focus on making three key decisions (discussed in section 4.1) that will enhance the total shareholder return.

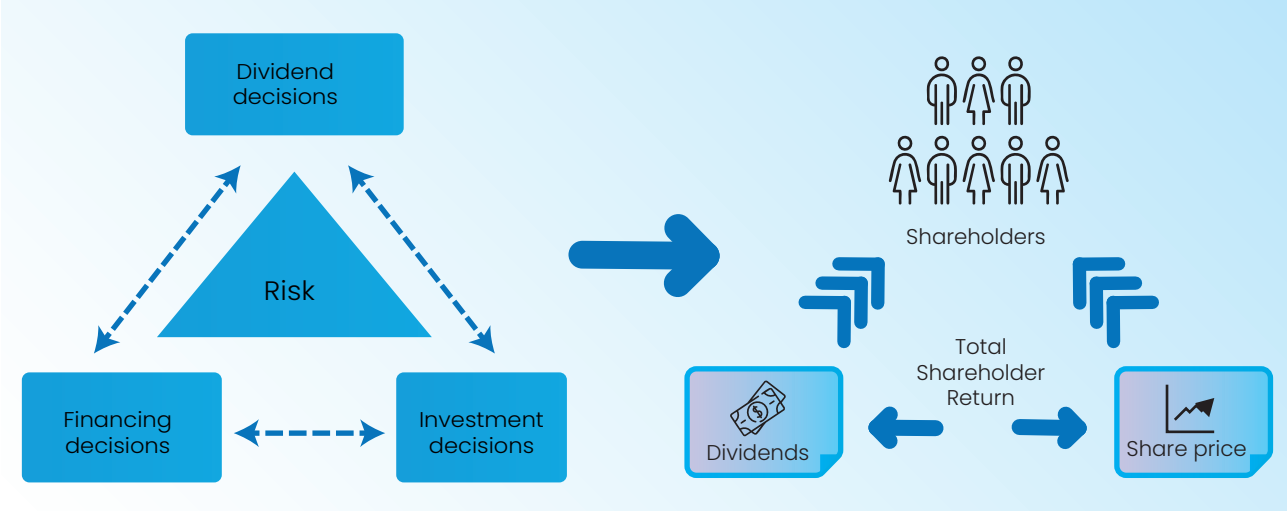


Figure 3: Relationship between 3 key decisions and TSR

To measure if this goal is being achieved, we can use two formulas,

formulae	**Return on Investment (ROI) =** $\frac{\textit{Net profit}}{\textit{Cost of investment}}$ **x 100%**

formulae	**Total Shareholder return**	**Dividends**	**Share price**
	TSR =	**Dividends paid +**	$\frac{\textit{Change in the share price}}{\textit{Share price at the start of the year}}$

A2 Not-for-profit organisations

2.1 Objectives of NFP Organisations

The objectives of not-for-profit (NFP) organisations, such as charities, NGOs, and social enterprises, differ significantly from those of for-profit businesses. Here are the key objectives of NFPs:

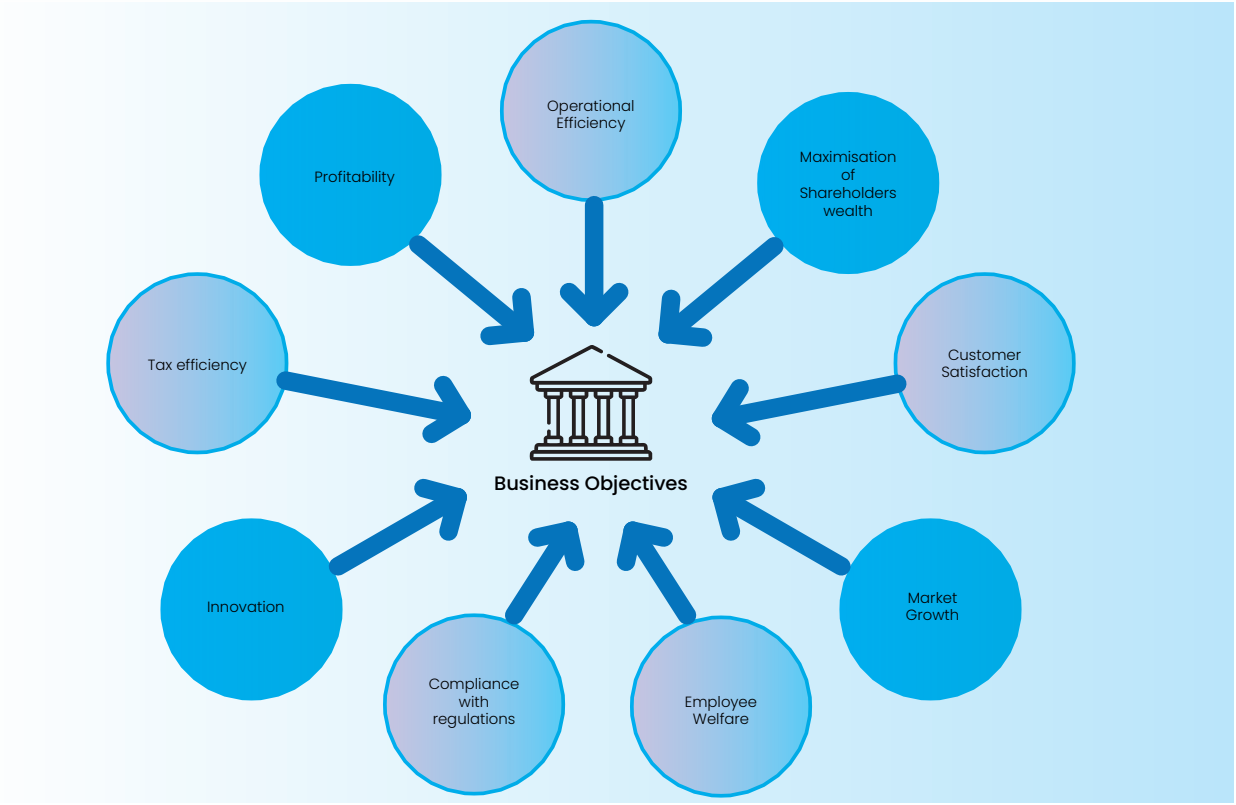


Figure 4: Not for Objectives

Not-for-profit organisations (NFPs) must evaluate their progress towards achieving their objectives, but traditional financial measures are often inadequate for this purpose. Instead, these organisations primarily focus on Key Performance Indicators (KPIs) and Critical Success Factors (CSFs) that are predominantly non-financial in nature. By focusing on these non-financial measures, NFPs can better assess their impact and effectiveness in achieving their mission. This approach also helps in demonstrating accountability to stakeholders, including donors and beneficiaries.

A particularly effective tool for this assessment is the concept of Value for Money (VFM).

2.2 Value for Money

2.2.1 VFM as an alternative measure to profit

The concept of Value for Money (VFM) focuses on allocating resources in a manner that maximises benefits whilst minimising costs. For not-for-profit organisations (NFPs) such as charities and non-governmental organisations (NGOs), where resources are often scarce, optimising the use of these resources is particularly crucial. To achieve VFM and maximise the impact of limited resources, NFPs can employ the following strategies:

	Explanation
Economy	Purchase of inputs of appropriate quality at minimum cost. For NFP organisations this means they will need to obtain resources at a very low cost, but this can often affect quality.
Effectiveness	this refers to the degree to which a system, process, or activity achieves its intended goals or outcomes.
Efficiency	This is the measure of how effectively a system, process, or device converts **inputs into useful outputs**. For example, a light bulb's efficiency is measured by how much of the electrical energy it consumes is converted into light rather than heat.

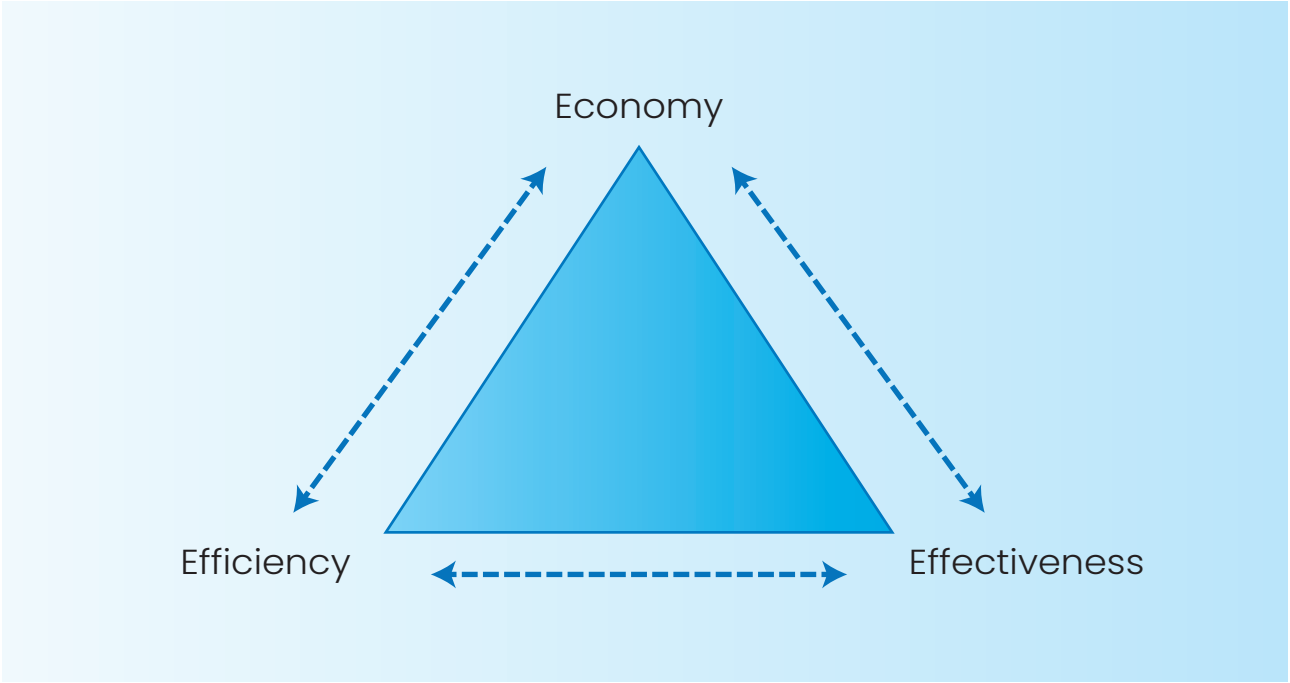


Figure 5: The 3 Es of Value for money (VFM)

NFPs needs to balance these three factors because concentration on one factor might mean that the other factors are affected. For example, achieving economy might mean that the organisation might order cheap suppliers from outside the country which might be slow. This might mean that the supplies might not be available on time to be effective. Effectiveness is about doing the right things to produce the desired results, whereas efficiency is about doing things in the right manner with minimal resources. Both are important for overall performance, but they address different aspects of success.

A3 Stakeholders

A stakeholder is someone who can affect or be affected by an organisation. This broad definition but as financial managers we need to categorise them so we can focus on the key players of the business and consider how we impact all stakeholder groups.

3.1 Stakeholder Groups

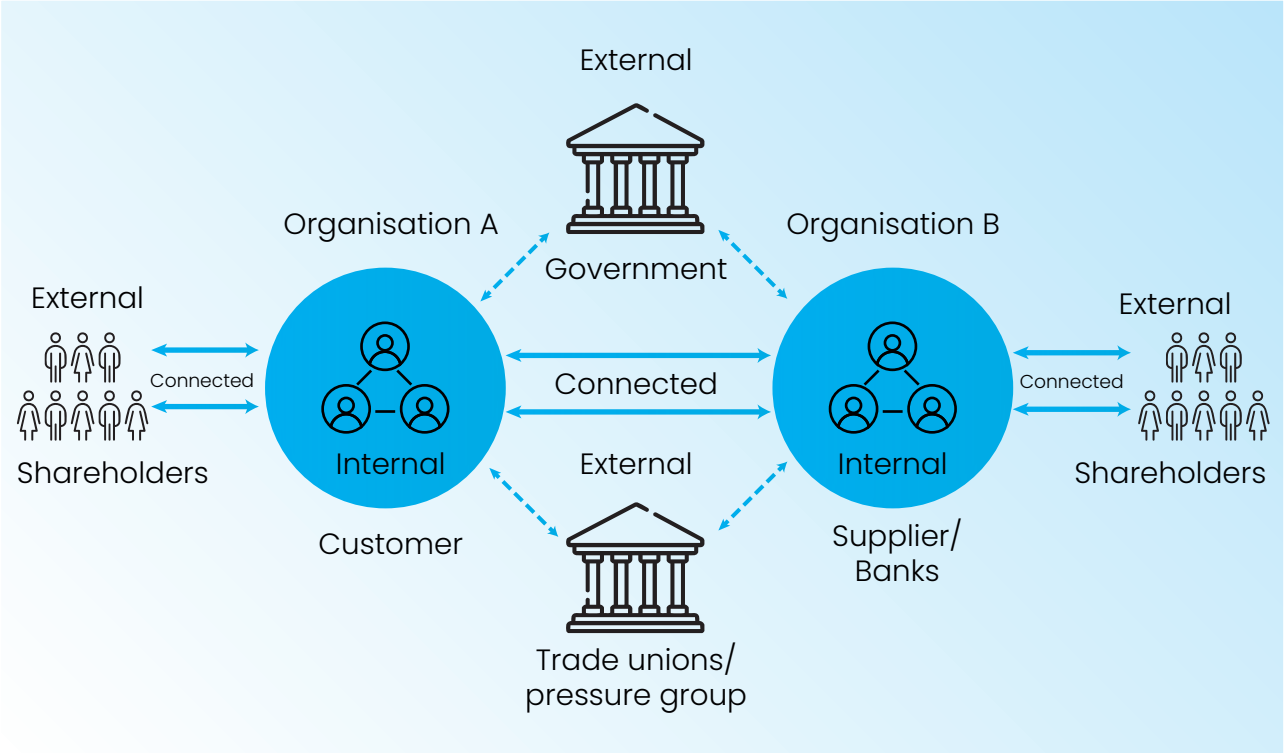


Figure 6: Stakeholder groups and their relationships

The figure illustrates that an organisation will have some stakeholders internally, who are part of the organisation. The organisation can also be connected to stakeholders from other organisations (e.g., Organisation B, shareholders, banks); these are referred to as connected stakeholders.

Both organisations will have other stakeholders who are not necessarily connected but can either be affected by or affect the organisation. For example, the government, which sets policies that can impact the organisation, and trade unions and pressure groups, these are external stakeholders.

3.1.1 Financial Managers role in satisfying stakeholders

Financial managers need to consider how their decisions can affect all stakeholders while prioritising the objectives of their main stakeholders. Financial managers play a crucial role in satisfying stakeholders by balancing the often-competing interests of various groups. They are responsible for maximising shareholder value through effective financial planning, risk management and resource allocation.

Simultaneously, they must ensure the company meets its obligations to creditors, maintains financial stability and complies with regulatory requirements. Financial managers also work to provide transparent and accurate financial reporting to build trust with investors

and analysts. They contribute to employee satisfaction by managing compensation and benefit programmes effectively. Additionally, they support the company's ability to serve customers and contribute to the community by ensuring financial health and sustainability. Ultimately, their decisions and strategies aim to create long-term value for all stakeholders.

3.1.2 Stakeholder Conflict

Stakeholder theory explores how financial managers can attempt to balance these objectives by considering the impact of their decisions on other stakeholders. Where conflicts arise, they must try to resolve them. The table below shows a few examples of conflicts that could arise between these stakeholder groups.

Stakeholders	**Objective**	**Conflict**
Shareholders	Maximisation of shareholders' wealth.	These two objectives can conflict because if financial managers focus solely on maximising shareholders' wealth, they may need to reduce or minimise employee benefits, which can lead to issues with the employees.
Employees	Maximisation of employee benefits.	
Stakeholders	Objective	Conflict
Shareholders	Maximisation of shareholders' wealth.	If the financial manager concentrates only making their products cheap to make the customers happy, this can conflict with **maximising shareholders' wealth,** as they will not make maximum profits.
Customers	Getting the cheapest products for the organisation.	

Real world Example

A classic example of stakeholder conflict is the Enron scandal. Enron's executives, driven by personal financial gain, engaged in unethical accounting practices to inflate profits and hide debt, misleading shareholders and employees. While executives benefitted from rising stock prices, employees, whose retirement savings were tied to Enron stock, and shareholders were kept in the dark about the company's true financial state. Regulators and auditors failed to detect the fraud due to conflicts of interest and regulatory gaps. The conflict culminated in Enron's bankruptcy in 2001, causing massive financial losses and leading to significant regulatory reforms.

Read up on Enron to learn about when Financial Managers fail to achieve their objectives due conflict of interest.

3.2 Agency Theory

The example above leads us to the agency theory; the theory highlights the potential conflict between the goals of an organisation's directors and the objective of maximising shareholders' wealth. Directors may sometimes make decisions that serve their own interests, which can conflict with the primary goal of maximising shareholder's wealth. Directors of an organisation are considered agents of the shareholders because they are entrusted with the responsibility of managing the company on their behalf of the principal (shareholders).

As agents, their primary role is to utilise the funds provided by the shareholders to generate profits, thereby increasing shareholder wealth. However, as we discussed earlier with the Enron case, this outcome is not always achieved. Conflicts can arise between the goal of maximising shareholder wealth and the directors' own interests in maximising their personal wealth. Since managers are the ones running the business, their objectives are often prioritised. Therefore, it is crucial to strike a balance through the implementation of appropriate incentives and good corporate governance, which are discussed below.

3.2.1 Use of rewards to solve the problem

To resolve the agency problem, organisations can indeed use incentive schemes to create goal congruence. Goal congruence refers to the alignment of the agents' (typically managers') goals with those of the organisation. This can be achieved through the following strategies:

Incentive	Objective	Examples
Share Options	By offering share options, the company incentivises its key personnel to work towards increasing the company's share price, as the value of their own options rises with the company's success.	if a CEO is granted 100,000 share options at a strike price of FRW10 per share, and the share price rises to FRW20, the CEO can exercise the options, buying the shares at the FRW10 price and potentially selling them at the market price of FRW20, thereby making a significant profit. This incentivises the CEO to work towards increasing the company's share price.
Bonus tied to long term results	Unlike short-term bonuses, which are usually based on meeting annual performance targets, long-term bonuses are contingent upon achieving specific **strategic objectives over a more extended period,** often three to five years or more.	A bonus tied to increasing the company's market share. bonuses that are paid out only if the company's share price reaches a certain level over a specified period. Achievement of long-term ESG goals, such as reducing carbon emissions, improving workplace diversity, or enhancing community impact.

Incentive	Objective	Examples
Non-financial rewards	The goal of non-financial rewards is to motivate, engage, and retain employees by recognising their contributions and providing incentives that satisfy their intrinsic needs, beyond just monetary compensation. These can enhance job satisfaction, foster a positive work environment, and align employee behaviours with the organisation's values and goals.	Promoting a good work life balance. Encouraging Skill Development Team-building activities, public recognition of team achievements, and collaborative projects can strengthen team cohesion and encourage a culture of collaboration.

3.3 Corporate Governance

Corporate governance refers to the system of rules, practices, and processes by which a company is directed and controlled.

"Corporate governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined." (OECD, 2015)

The OECD (2015) set out key aspects of corporate governance which include;

- The relationships between various stakeholders.
- The structure for setting company objectives.
- The means for achieving these objectives.
- The process of monitoring performance.

Organisations need to practise good corporate governance especially if they are part of a stock exchange. Here are some of the main aspects that are regarded as good corporate governance;

Mechanism	Objective
Remuneration committee	Ensures fair, transparent executive compensation aligned with company performance, preventing conflicts of interest in pay decisions.
Audit committee	Oversees financial reporting, internal controls, and external audits, enhancing transparency and preventing fraudulent practices.

Mechanism	Objective
Nomination committee	Ensures diverse, skilled board composition through unbiased selection, promoting effective governance and fresh perspectives.
Separation of Managing Director (MD) and Chairman of the organisation	Prevents concentration of power, ensures checks and balances, and improves board independence and oversight.
A significant percentage of Non-Executive Directors (NEDs) in the board of directors	Provides independent oversight, diverse expertise, and objective decision-making, balancing executive and shareholder interests effectively.
Independent NEDs with short term contracts (3-4 years) and no share options	Maintains objectivity, reduces conflicts of interest, and ensures regular board refreshment for ongoing effective governance.

Real world Example

Good corporate governance could have prevented the Enron scandal through independent oversight, effective auditing, risk management, and ethical practices. Transparent reporting, whistleblower protection, and aligned executive compensation would have created checks and balances, making fraudulent activities harder to conceal. These measures encourage accountability and transparency, potentially averting the financial manipulation that led to Enron's collapse. Post-Enron, many governance practices have been strengthened through legislation.

3.4 Home Grown Governance

This refers to corporate governance practices that are developed within a specific country or region, considering local cultural, legal, and business environments, rather than adopting a one-size-fits-all approach from international standards.

According to the Rwanda Governance Board (2018):

"Rwanda's home-grown solutions have been instrumental in fostering good governance, including in the corporate sector. These solutions, rooted in our culture and adapted to modern challenges, have significantly contributed to Rwanda's rapid development and improved business environment."

Key aspects of Rwanda's home-grown governance include:

- Integration of traditional values: The concept of "Agaciro" (dignity) is incorporated into governance practices, emphasising integrity and self-reliance.
- Performance contracts: Known as "Imihigo," these contracts set clear targets for public institutions and are now being adapted for the private sector.
- Community-based problem-solving: "Umuganda" (community work) principles are applied to encourage collective responsibility in corporate settings.

- Gender balance: Rwanda's strong focus on gender equality is reflected in board composition requirements.
- Anti-corruption measures: Drawing from the country's zero-tolerance policy on corruption, strict ethical standards are emphasised in corporate governance.

(Rwanda Governance Board, 2018)

A4. Financial manager's role

4.1 The 3 key decisions

According to Brigham and Ehrhardt (2011):

"The primary objective of financial management is to maximise the value of the firm to its shareholders. Value is represented by the market price of the company's shares, which, in turn, is a reflection of the firm's investment, financing, and dividend decisions."

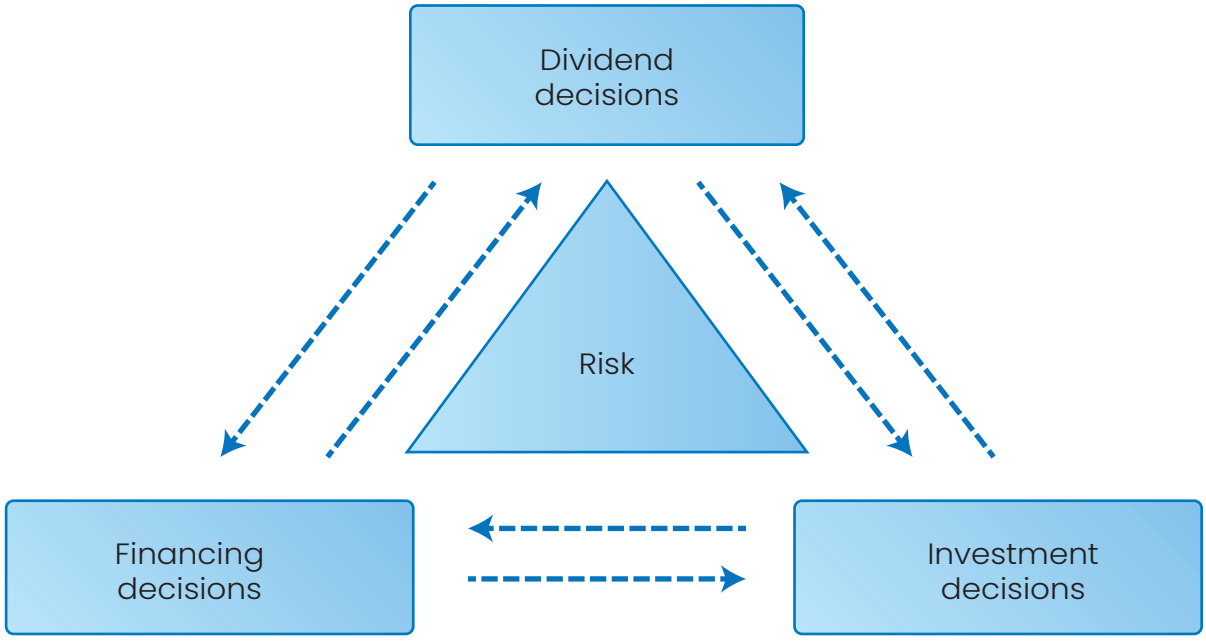


Figure 7: The 3 keys decisions

Decision	Objective	Examples
Investment Decision	Allocation of the firm's resources to the most profitable projects or assets, ensuring the best possible **return on investment.**	Decisions include evaluating potential investments in new projects, expansion plans, or acquisitions. Tools like **Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period** are commonly used to assess the viability of investments.
Investment Decision	The aim is to determine the best capital structure for the company, **balancing debt and equity** to finance its operations and growth while minimising the **cost of capital.**	Whether through equity **(issuing shares), debt (loans, bonds)**, or a combination of both. Factors such as the cost of capital, market conditions, and the company's financial strategy play a crucial role in these decisions.
Dividend Decision	The aim is to determine the portion of profits that should be distributed to shareholders versus the amount that should be retained in the business for future investments.	This involves deciding how much dividend is paid out. The decision depends on factors such as **the company's current profitability, future growth prospects, cash flow needs,** and **shareholders' expectations.**

4.1.1 The role of Risk Management

Risk management plays a crucial role in each of the three key decisions. It involves identifying, assessing, and mitigating potential risks that could adversely affect the company's financial health and objectives. Effective financial management requires a comprehensive approach to risk management, ensuring that risks are considered across all decisions. This involves continuous monitoring and adjustment of risk management strategies to align with changing market conditions and business needs. Strong corporate governance frameworks support risk management by ensuring that there are clear policies and procedures for identifying, assessing, and managing risks in all areas of financial decision-making.

A5. Short-term and long-term financial strategy

5.1 Measuring performance

Measuring financial performance is vital for businesses. It assesses profitability, guides decisions, attracts investors, and improves efficiency. It enables competitive analysis, ensures compliance, and indicates long-term viability. Let's look at some of the measures that can be used by the financial manager to monitor achievement of organisational goals

5.1.1 Categories of performance measures

Profitability ratios

formulae

$$\text{Return on Investment (ROI)} = \frac{\textit{Net profit}}{\textit{Cost of investment}} \times 100\%$$

Return on Investment (ROI) is a performance measure used to evaluate the efficiency or profitability of an investment. It directly compares the net profit generated by an investment to its cost. A higher ROI suggests that an investment is more efficient or profitable. For example, an ROI of 20% means that for every FRW1 invested, the company earns FRW0.20 in profit.

formulae

$$\text{Gross Profit Margin} = \frac{\textit{Revenue-Costs of goods sold}}{\textit{Revenue}} \times 100\%$$

Gross Profit Margin measures the percentage of revenue that exceeds the cost of goods sold. It indicates how efficiently a company uses its resources to produce goods or services. A higher margin suggests better efficiency in the production process.

formulae

$$\text{Net Profit Margin} = \frac{\textit{Net Profit}}{\textit{Revenue}} \times 100\%$$

Net Profit Margin shows the percentage of revenue that translates into profit after all expenses have been deducted. It reflects a company's overall profitability and how well it controls its costs. A higher net profit margin indicates better overall financial performance.

formulae

$$\text{Return on Equity (ROE)} = \frac{\textit{Profit after interest and tax}}{\textit{Average Shareholders' Equity}} \times 100\%$$

ROE measures the return generated on shareholders' equity, or the company's net assets. It shows how effectively a company uses its shareholders' investments to generate profits. A higher ROE generally indicates better performance in utilising equity to create profits.

formulae

$$\text{Return on Capital Employed (ROCE)} = \frac{\textit{Profit from operations}}{\textit{Capital Employed}} \times 100\%$$

Return on Capital Employed (ROCE) measures a company's profitability and the efficiency with which its capital is employed. It is considered one of the best measures of corporate performance as it shows how well a company is generating profits from its capital. If a company has a ROCE of 15%, it means it generates 15 pence of profit for every pound of capital employed.

Debt ratios

formulae

$$\text{Gearing} = \text{or} \quad \frac{\textit{Book value of debt}}{\textit{Book value of equity}} \quad \text{or} \quad \frac{\textit{debt}}{\textit{debt + equity}}$$

Measures the extent to which a company's operations are funded by debt versus shareholders' equity. It indicates the financial risk and leverage of a company. A higher gearing ratio suggests higher financial risk, as the company relies more on debt financing. However, it can also lead to higher returns for shareholders if the company performs well.

formulae

$$\text{Interest Cover} = \frac{\textit{Profit from operations}}{\textit{interest}}$$

The interest coverage ratio measures a company's ability to pay the interest on its outstanding debt. It shows how many times over a company can pay its interest charges with its pre-tax earnings. A higher ratio indicates a better ability to meet interest payments, suggesting lower financial risk. Generally, a ratio below 1.5 might be considered concerning, while a ratio above 2 is typically seen as comfortable.

Liquidity ratios

formulae

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

This indicates how many times over a company can cover its current liabilities with its current assets. A ratio above 1 suggests good short-term liquidity, with a ratio of 2:1 often considered ideal. However, a very high ratio might indicate inefficient use of assets.

formulae

$$\text{Quick Ratio (Acid-Test Ratio)} = \frac{\textit{Current Assets (Less inventory)}}{\textit{Current Liabilities}}$$

The Quick Ratio excludes inventory from current assets, as inventory is typically the least liquid current asset. This ratio shows a company's ability to meet its short-term obligations using its most liquid assets. A ratio of 1: 1 or higher is generally considered good, indicating that the company can pay off its current liabilities without relying on the sale of inventory.

Shareholder investor ratios

formulae

$$\text{Price-to-Earnings (P/E) Ratio} = \frac{\textit{Market Price per Share (MPS)}}{\textit{Earning per Share (EPS)}}$$

The P/E ratio measures the price investors are willing to pay for each pound of a company's earnings. It's a valuation metric that helps investors determine if a stock is overvalued or undervalued. A high P/E could suggest that investors expect higher earnings growth in the future, or that the stock is overvalued. Conversely, a low P/E might indicate an undervalued stock or lower growth expectations.

formulae

$$\text{Dividend Yield} = \frac{\textit{Annual Dividends per Share (DPS)}}{\textit{Market Price per Share (MPS)}} \times 100\%$$

Dividend yield represents the annual dividend income per share as a percentage of the share price. It indicates how much a company pays out in dividends each year relative to its stock price. A higher yield might be attractive to income-focused investors, but it could also suggest limited growth prospects if the company is paying out a large portion of its earnings as dividends.

formulae

$$\text{Earnings Per Share (EPS)} = \frac{\textit{Profit didtributed to shareholders}}{\textit{Number of ordinary shares}}$$

EPS measures the portion of a company's profit allocated to each outstanding share of common stock. It's a key indicator of a company's profitability and is often used to compare profitability between different companies or for the same company over time. A higher EPS generally indicates greater value, as investors are paying more for a company's earnings.

formulae

$$\text{Earnings Yield Ratio} = \frac{\textit{Earning per Share (EPS)}}{\textit{Market Price per Share (MPS)}} \text{ X 100\% or the inverse of PE}$$

Earnings yield is the inverse of the P/E ratio, expressed as a percentage. It shows how much earnings an investor is getting for each pound invested in a share of the company. A higher earnings yield suggests that the stock is undervalued relative to its earnings. This metric is useful for comparing stocks with different prices or comparing stocks to other investments like bonds.

5.2 Limitations of Financial Analysis

While financial analysis can show how well an organisation is doing in achieving its goal, but it can have its limitations, some of the main limitations include the following;

Limitation	Explanation
Historical Focus	Financial statements primarily reflect past performance and may not accurately predict future outcomes or potential.
Can be affected by accounting policies	Different accounting methods can lead to inconsistencies in financial reporting across companies or time periods.
Creative Accounting	Financial statements can be manipulated within legal boundaries, potentially misleading analysts.
Short term focus	Emphasis on short-term financial metrics may overshadow long-term value creation and sustainability.
Lack of forward-looking information	Financial statements typically don't provide detailed forecasts or strategic plans.
Technological changes	Rapid technological advancements can quickly render historical financial data less relevant.

5.3 Non-Financial Performance

Non-financial performance measures are vital in balancing the objective of all stakeholders and making sure that the organisation does not rely solely on financial measures given the limitations listed above. Some of the key non-financial measures include;

- Customer-related measures include customer satisfaction, customer retention rates, market share, customer complaints, and brand recognition.
- Employee-related measures consist of employee satisfaction, employee turnover rates, and health and safety records.
- Operational and process measures encompass product or service quality, operational efficiency, cycle time (such as time to market or production cycle time), and supply chain performance.

- Innovation and growth measures focus on innovation and research & development (R&D).
- Social and environmental measures include environmental impact and social responsibility and community engagement.

5.3.1 Limitations of NFP ratios

Limitation	Explanation
Subjectivity	Non-financial measures often involve subjective judgment, making them difficult to quantify or compare objectively.
Overemphasis on Non-Financial Metrics	Focusing too much on non-financial measures may lead to neglecting financial performance, potentially harming overall business success.
Potential for Misalignment	Non-financial measures may not always align with overall business objectives, leading to a focus on metrics that don't directly contribute to financial success.
Measurement Challenges	It can be difficult to consistently measure non-financial factors, especially those that are qualitative, such as employee satisfaction or brand recognition.
Changing Relevance	Non-financial measures may lose relevance over time as business environments, technologies, and customer preferences evolve.

5.4 A balanced approach

Given that both financial and non-financial measures have limitations, a balanced approach can help mitigate some of the issues inherent in each method. Kaplan and Norton (1992) introduced the Balanced Scorecard, a strategic framework aimed at aligning business activities with an organisation's vision and strategy. It seeks to enhance internal and external communications and monitor organisational performance by monitoring Critical Success Factors (CSFs) through Key Performance Indicators (KPIs).

5.4.1 The Balanced Scorecard

The Balanced Scorecard justifies its use by providing a comprehensive performance measurement framework that balances financial metrics with non-financial measures. It links strategic objectives to actionable goals across four perspectives—financial, customer, internal processes, and learning and growth—ensuring a holistic approach to achieving long-term business success.

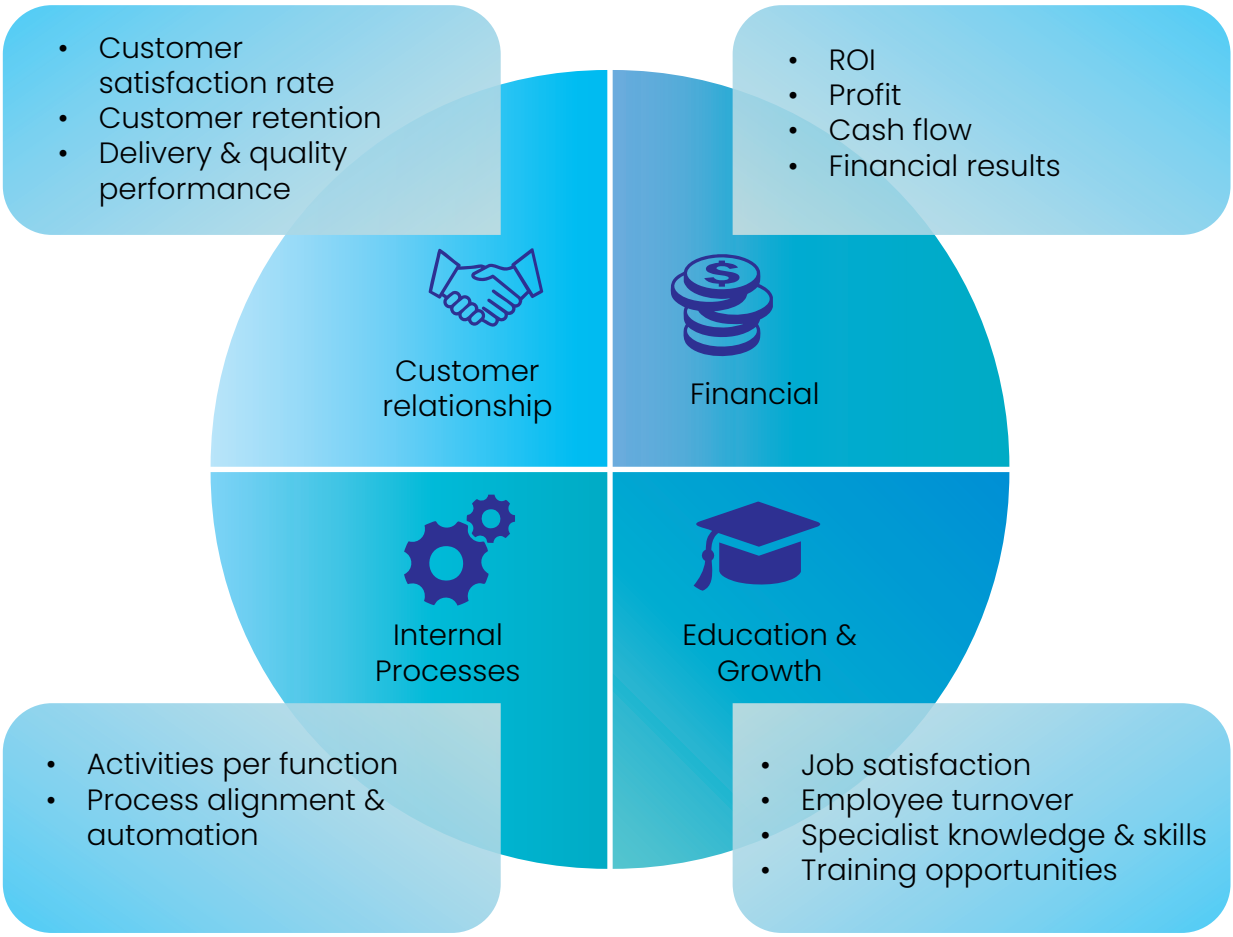


Figure 8: The Balanced Scorecard[1]

Adopted from (Professional Academy , 2024)

[1] *Adopted from (Professional Academy , 2024)*

5.4.2 Advantages and Disadvantages of using the BSC

Advantages	Disadvantages
Holistic approach: Provides a comprehensive view of organisational performance.	**Complexity:** Can be challenging to implement and maintain.
Strategy alignment: Links day-to-day operations with long-term goals.	**Time-consuming:** Requires significant effort to develop and update.
Improved communication: Facilitates better understanding of strategy across the organisation.	**Overemphasis on metrics:** May lead to focusing too much on measurements rather than actual improvements.
Performance measurement: Offers a structured approach to tracking progress.	**Potential for bias:** The selection of metrics can be subjective.
Flexibility: Can be adapted to various industries and organisation types.	**Cost:** Implementation and maintenance can be expensive, especially for smaller organisations.

Source: (Kaplan & Norton, 1992)

Unit A Key Terms

Agency problem A3
Balanced Scorecard
CSFs A2
Different types of ratios A5
Dividend decisions A4
Economy A2
Effectiveness A2
Efficiency A2
Financial Managers role in satisfying A3
Financing decision A4
Focus of Financial Analysis A5
Focus of Non-Financial Analysis A5
For profit objectives A2
Good Corporate Governance A3
Home Grown Governance A3
Investment decision A4
KPIs A2
KPIs and CSFs A5
Limitations of NFP ratios A5
Limitations of ratios A5
Not for Profit Objectives A2
Ratio Analysis A5
Ratio Categories A5
Reward Management A3
Risk Management
Stakeholder conflict A3
Types of Stakeholders A3
Value for Money A2

Summary of Unit A and key learning outcomes

Learning Outcomes	Summary
For-profit organisations	In our first unit of the course, we have looked at the fundamental objectives of businesses and financial management. We explored profit maximisation as a primary goal, considering its short-term and long-term implications, as well as the impacts of factors like tax and technology. We then examined wealth maximisation as an alternative objective, focusing on shareholder returns and total shareholder value. The unit compared these approaches, discussing their merits and limitations, and highlighted the importance of balancing various stakeholder interests in corporate strategy and financial decision-making. Additionally, we discussed the crucial role of finance managers in aligning financial strategies with overall business objectives and optimising resource allocation to achieve these goals.
Not-for-profit organisations	We have examined the objectives of not-for-profit (NFP) organisations, contrasting them with for-profit entities. We explored the shift from profit-centric goals to a focus on Key Performance Indicators (KPIs) and Critical Success Factors (CSFs) in the NFP sector. The unit introduced Value for Money (VFM) as an alternative measure to profit, delving into its three key components: economy, effectiveness, and efficiency. We discussed how NFPs use these metrics to evaluate their performance and ensure they're meeting their mission-driven objectives. Additionally, we considered the role of financial managers in NFPs, balancing financial sustainability with achieving social or charitable aims.
Stakeholders	We also explored the complex landscape of stakeholder management and corporate governance. We examined various stakeholder groups and the financial manager's role in balancing their often-conflicting interests. The unit introduced agency theory, discussing how the misalignment between managers' and shareholders' interests can lead to the agency problem, and explored reward management as a potential solution. We delved into the principles of good corporate governance, emphasising its importance in ensuring ethical and effective organisational management. Finally, we considered the concept of home-grown governance, discussing how organisations can develop tailored governance structures that align with their specific needs and cultural contexts.

Learning Outcomes	Summary
Financial manager's role	We then focused on the three key financial decisions: investment, financing, and dividend decisions. We examined how these crucial choices shape an organisation's financial strategy and explored the integral role of risk management in each decision-making process. The unit emphasised how financial managers must balance these decisions to optimise organisational performance and stakeholder value.
Short-term and long-term financial strategy	Lastly, we have examined various approaches to measuring organisational performance. We explored ratio analysis as a key financial performance measure, discussing different categories of ratios and their applications. The unit then addressed the limitations of purely financial analysis, highlighting the need for a more comprehensive approach. We delved into non-financial performance measures, particularly relevant for not-for-profit organisations, and discussed their unique challenges and limitations. Finally, we introduced the Balanced Scorecard as a holistic performance measurement tool, combining financial and non-financial metrics. We analysed its use of Key Performance Indicators (KPIs) and Critical Success Factors (CSFs) and evaluated the advantages and disadvantages of this balanced approach in providing a more rounded view of organisational performance.

Unit A Quiz questions

1. What does a higher Return on Equity (ROE) generally indicate?
   A) Lower profitability
   B) More efficient use of shareholders' equity
   C) Higher debt levels
   D) Decreased asset turnover

2. In the context of the P/E ratio, what does a lower value typically suggest?
   A) The stock is overvalued
   B) The company has high growth prospects
   C) The stock might be undervalued
   D) The company pays high dividends

3. Which of the following are components of the Current Ratio? (Select all that apply)
   A) Inventory
   B) Cash and Cash Equivalents
   C) Long-term Debt
   D) Accounts Receivable
   E) Prepaid Expenses

4. Which of the following are typically included in the calculation of Earnings Per Share (EPS)? (Select all that apply)
   A) Net Profit
   B) Preferred Dividends
   C) Number of Outstanding Ordinary Shares
   D) Market Price per Share
   E) Total Assets

5. Which of the following are the four traditional perspectives in Kaplan and Norton's Balanced Scorecard framework?
   A) Financial, Customer, Internal Business Process, Learning and Growth
   B) Financial, Market Share, Operations, Human Resources
   C) Profit, Customer Satisfaction, Efficiency, Employee Development

D) Revenue, Brand Loyalty, Innovation, Talent Management

E) Shareholder Value, Customer Value, Process Excellence, Organisational Capability

6. A company had a share price of FRW10 at the start of the year. By the end of the year, the share price had risen to FRW12. During the year, the company paid a dividend of FRW0.50 per share.

What was the Total Shareholder Return for the company for the year?

A) 20.00%

B) 25.00%

C) 22.50%

D) 27.50%

E) 30.00%

7. In the context of Value for Money analysis, which statement correctly describes the relationship between Economy, Efficiency, and Effectiveness?

A) Economy refers to maximizing profits, Efficiency to minimizing costs, and Effectiveness to customer satisfaction

B) Economy relates to input costs, Efficiency to the conversion of inputs to outputs, and Effectiveness to achieving desired outcomes

C) Economy means cutting all expenses, Efficiency is about working faster, and Effectiveness is about producing more

D) Economy is about saving money, Efficiency is about following rules, and Effectiveness is about meeting deadlines

8. Which of the following are limitations of relying solely on financial performance measures? (Select all that apply)

A) They may not capture important non-financial aspects of performance

B) They often focus on short-term results at the expense of long-term value creation

C) They can be manipulated through creative accounting practices

D) They may not reflect customer satisfaction or employee morale

E) They are always too complex for managers to understand

F) They provide real-time, up-to-the-minute performance data

9. A company has the following financial information:

Cash and cash equivalents: FRW50,000

Accounts receivable: FRW75,000

Inventory: FRW100,000

Current liabilities: FRW200,000

Calculate the quick ratio for XYZ Company and select the correct answer.

A) 0.50

B) 0.63

C) 0.75

D) 1.25

(Round your answer to two decimal places if necessary)

10. Which of the following are considered key principles of good corporate governance? (Select all that apply)

A) Transparency in financial reporting and disclosure

B) Accountability of the board of directors to shareholders

C) Maximizing short-term profits at any cost

D) Independence of the board from management

E) Ethical decision-making and corporate social responsibility

F) Centralisation of power in a single executive

G) Protection of shareholder rights

H) Ignoring minority shareholders' interests\

11. Match each stakeholder group with their primary interest or concern:

Stakeholder	Objective
Shareholders	A. Job security and fair compensation
Employees	B. Return on investment and company growth
Customers	C. Timely payments and long-term contracts
Suppliers	D. Quality products/services and value for money
Government	E. Environmental impact and local employment
Local Community	F. Compliance with regulations and tax revenue

12. Which of the following statements correctly describe aspects of agency theory in the context of corporate governance? (Select all that apply)

A) Agency theory addresses the potential conflicts of interest between principals (shareholders) and agents (managers).

B) According to agency theory, managers always act in the best interests of shareholders without the need for oversight.

C) Agency costs are expenses incurred to align the interests of principals and agents.

D) The separation of ownership and control in modern corporations is a key premise of agency theory.

E) Agency theory suggests that incentive structures, such as performance-based compensation, can help align manager and shareholder interests.

F) According to agency theory, information asymmetry between managers and shareholders is not a significant concern.

G) Corporate governance mechanisms, such as board oversight, are irrelevant in the context of agency theory.

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Unit B: Economic environment

Learning outcomes

B1. Government objectives

B2. Demand and supply in the economy

B3. Market structures

B4. Monetary policy

B5. Fiscal policy

Introduction to Unit B

In this unit, we will explore the multifaceted economic environment that shapes business operations and decision-making. We begin by examining government objectives, understanding how these goals influence economic policies and market conditions. We then explore the dynamics of demand and supply dynamics in the economy.

Our discussion extends to various market structures, from perfect competition to monopolies, exploring how these affect business strategies discussed in Unit A. We then delve into the critical tools of economic management: monetary policy and fiscal policy, exploring how central banks use monetary policy to control inflation and stimulate growth, while governments employ fiscal policy to achieve economic objectives and manage the business cycle.

We will explore real-world examples and case studies to illustrate how economic principles manifest in practice. As we navigate these topics, you'll develop valuable insights into leveraging economic knowledge for success in the global marketplace.

B1. Government objectives

Government economic policies play a crucial role in shaping national and global economies. These policies can be broadly categorised into macroeconomic and microeconomic approaches. While macroeconomic policies focus on the overall economy, microeconomic policies target specific sectors or issues. Understanding the interplay between these two types of policies is essential for understanding how governments influence economic outcomes and societal well-being.

1.1 Measuring GDP and macro-objectives

1.1.1 Macro and Micro economic policies

When the government is looking to shape up the economy, they broadly look at two categories: macroeconomic and microeconomic policies. The table below categorises what each policy focuses on with some examples of what is involved in each policy and how the government can use this to manage GDP which we explore in the next section.

Macroeconomic policies 2

Policy	Economic Factors
Fiscal Policy	Fiscal Policy involves **government spending and taxation**, **budget deficits or surpluses,** and providing stimulus packages during recessions **(see section 3.2).**
Monetary Policy	Monetary Policy includes **interest rate adjustments**, money supply control, and **quantitative easing (see section 3.1).**
Exchange Rate Policy	This is where the government try to adjust/**control the exchange rate** to maintain **economic stability** and promote economic health/growth. This can be done by balancing; **Fixed vs. floating exchange rates and currency interventions.**
Trade Policy	This includes policies on; **tariffs and quotas**, trade agreements and **export (X) /import(M)** regulations.
Income Policy	This looks at **wage and price controls** (rarely used) and **incomes policies** to manage inflation.

Microeconomic policies

Policy	Economic Factors
Competition Policy	Competition Policy implements **antitrust laws**, merger regulations, and **breaking up monopolies**.
Industrial Policy	Industrial Policy provides **subsidies** for specific industries, research and development incentives, and **regulations** on production methods.
Labor Market Policies	Labor Market Policies establish **minimum wage laws**, **worker protection regulations,** and job training programs.
Environmental Policies	Environmental policies enforce **pollution controls**, **carbon pricing**, and **incentives** for green technologies.
Regional Development Policies	These policies offer **incentives** for businesses in **underdeveloped areas** and **infrastructure development** in specific regions.

[2] *To explore some of the policies have a look at the IMF website for some explanations and country specific examples. https: //www.imf.org/en/Videos/index*

Education and Skills Policies	Provides **funding for education** and vocational training and address skills gaps in the workforce.
Innovation Policies	Innovation Policies enact **patent laws**, **grants for research and development**, and technology transfer programs.

1.1.2 GDP

Gross Domestic Product (GDP) is a key economic indicator measuring the total value of goods and services produced within a country's borders over a specific period. It provides crucial insights into economic health, growth rates, and living standards. This section explores GDP components, calculation methods, limitations, and its significance in shaping economic policies and international comparisons.

GDP is crucial because it provides a snapshot of a country's economic performance, guides policy decisions, and helps compare the economic productivity of different countries.

GDP can be calculated using three main approaches:

- Expenditure Approach: this method sums up all spending in the economy.
- Income Approach: adds up all income earned in the economy.
- Production (or Value Added) Approach sums the value added at each stage of production.

In this section we will explore the expenditure approach as this is the most used approach.

Expenditure Approach:

formulae	GDP = C + I + G + (X - M)				
GDP =	**C**	**I**	**G**	**X**	**M**
	Consumer Spending	Business Investment	Government Spending	Exports	Imports

Example

A country's economist has gathered the following data for their annual GDP calculation:

Consumer spending: FRW700 billion, Business investment: FRW250 billion, Government spending: FRW400 billion

Exports: FRW300 billion and Imports: FRW250 billion

a) Calculate the country's GDP using the expenditure approach.

b) What is the value of net exports?

c) Which component contributes the most to the GDP, and what percentage does it represent?

d) If consumer spending increases by 10% and all other components remain the same, what would be the new GDP?

Solution

Part a) FRW1400 billion

 **formulae**	GDP = C + I + G + (X - M)				
	C	**I**	**G**	**X**	**M**
GDP = FRW1400 billion	FRW700billion	FRW250 billion	FRW400 billion	FRW300 billion	FRW250 billion

Part b) Net exports is equal to Exports minus Imports (X-M) = FRW300 billion – 250 billion = FRW50 billion

Part c) Consumer Spending contributes the most at FRW700 billion. Percentage = (700 / 1400) * 100 = 50%

Part d) If consumer spending increases by 10% and all other components remain the same, what would be the new GDP?

Consumer Spending increase = FRW700 billion x 1.1(10% increase) = FRW770 billion

 **formulae**	GDP = C + I + G + (X - M)				
	C	**I**	**G**	**X**	**M**
GDP = FRW1470 billion	FRW770billion	FRW250 billion	FRW400 billion	FRW300 billion	FRW250 billion

1.1.3 Impact of Low unemployment

Given that consumer spending is quite key in GDP, the government will aim to have low levels of unemployment as this can impact GDP in many ways. Low unemployment typically boosts GDP by increasing consumer spending power and production capacity. With more people employed, there's greater overall income, leading to higher consumption.

Businesses can produce more goods and services, potentially increasing investment. However, extremely low unemployment may lead to wage inflation and labour shortages, potentially constraining further economic growth.

1.1.4 Impact of inflation

Inflation can also have an impact on GDP, but first let's look at what inflation is;

 **Key Term**	Inflation is the **rate** at which the general **level of prices for goods and services is rising** in an economy **over time.** In other words, it's the pace at which money loses its purchasing power.

Imagine a loaf of bread costs FRW1 today. If there's 5% inflation over a year, that same loaf might cost FRW1.05 next year. Your dollar now buys less bread than it did before - this is inflation in action. High inflation can erode savings and create economic instability. Very low inflation or deflation (falling prices) can also be problematic, potentially leading to economic stagnation.

Low inflation generally supports stable economic growth, positively impacting GDP. It maintains purchasing power, encourages consumer spending, and fosters business investment due to predictable costs. Low inflation also keeps interest rates moderate, stimulating borrowing and investment. However, extremely low inflation risks stagnation, potentially reducing spending as consumers anticipate further price drops, thereby slowing GDP growth.

1.1.5 Balance of Payments (BOP)

 **Key Term**	Balance of payments (BOP) is an important economic concept that records all economic transactions between **residents of a country and the rest of the world over a specific period**, typically a year.

It provides a comprehensive overview of a nation's economic interactions with other countries. It is important because balance of payments reflects a nation's economic health, guides policymakers in crafting monetary and fiscal strategies, and provides critical insights into foreign exchange pressures and global competitiveness. This is the (X-M) we saw in the GDP equation earlier.

Components of BOP

Components	Features
Current Account	This tracks trade in **goods and services**, **income flows**, and **current transfers. Examples include;** **Goods:** Kenya exporting tea and coffee to European markets. **Services:** Rwanda's growing tourism industry, particularly gorilla trekking experiences. **Income flows:** South African mining company receiving profits from its operations in Zambia.
Capital Account	This records capital transfers and transactions in non-produced, non-financial assets. For example, **non-produced, non-financial assets:** Nigeria granting oil exploration rights to a foreign company.
Financial Account	This covers investments and other financial flows. For example, **Direct investment:** Foreign companies investing in Rwanda's technology sector, particularly in the Kigali Innovation City.

BOP Balances

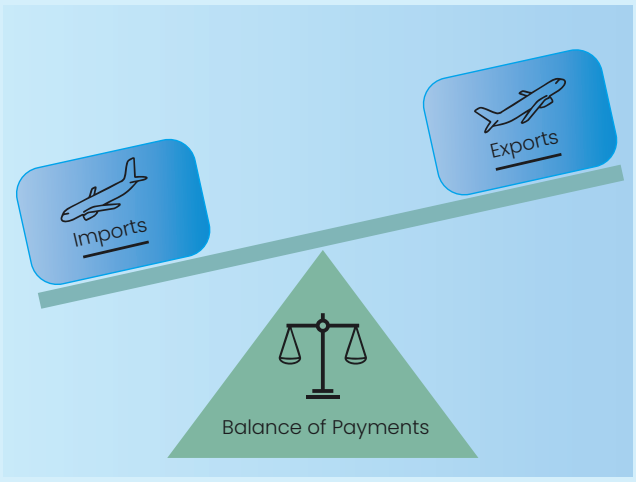
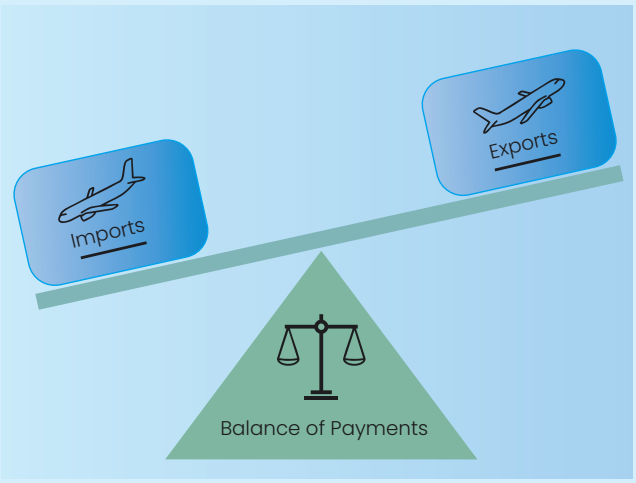
BOP Deficit	BOP Surplus
	
Deficit: More money going out(imports) than coming in(exports).	**Surplus:** More money coming in(exports) than going out(imports).
Deficit = (X<M)	**Surplus = (X>M)**
Persistent deficits may lead to currency depreciation and economic challenges	Consistent surpluses might indicate a strong economy but could also suggest underinvestment

Figure 9: Balance of Payments (BOP) Deficit and Surplus

Real world Example

In the late 2000s, Zimbabwe experienced hyperinflation, with inflation reaching 89.7 sextillion percent by November 2008. This crisis, driven by excessive money printing and economic mismanagement, rendered the Zimbabwean dollar worthless, leading to skyrocketing prices and severe economic instability. Unemployment soared to 80-90%, and the economy contracted by about 50% between 1998 and 2008. Consumer spending collapsed, and investment dried up due to extreme uncertainty. The government eventually abandoned the Zimbabwean dollar in favour of foreign currencies, stabilising inflation but leaving the economy fragile and requiring years to recover from the crisis. (McIndoe-Calder, Tara, Tara Bedi, and Rogelio Mercado., 2019)

The picture on the left shows one of the notes at the time inflation was high. The government tried to print larger denominations to tackle this problem, and this fuelled inflation. GDP shrank by over 50% at that time. By the end of 2008, Zimbabwe's GDP was estimated to be around $4.4 billion (USD), down from approximately $9.5 billion in 2000, reflecting the dramatic economic collapse during that period.

1.2 Economic Cycles

The business cycle, or economic cycle, illustrates the natural fluctuations in economic activity over time. It shows how economies experience periods of growth and contraction, reflected in changes in Gross Domestic Product (GDP). This cycle is crucial for policymakers, businesses, and investors as it affects employment, production, and living standards. The four main phases are expansion, peak, recession, and trough, with GDP growth rates varying significantly across these stages.

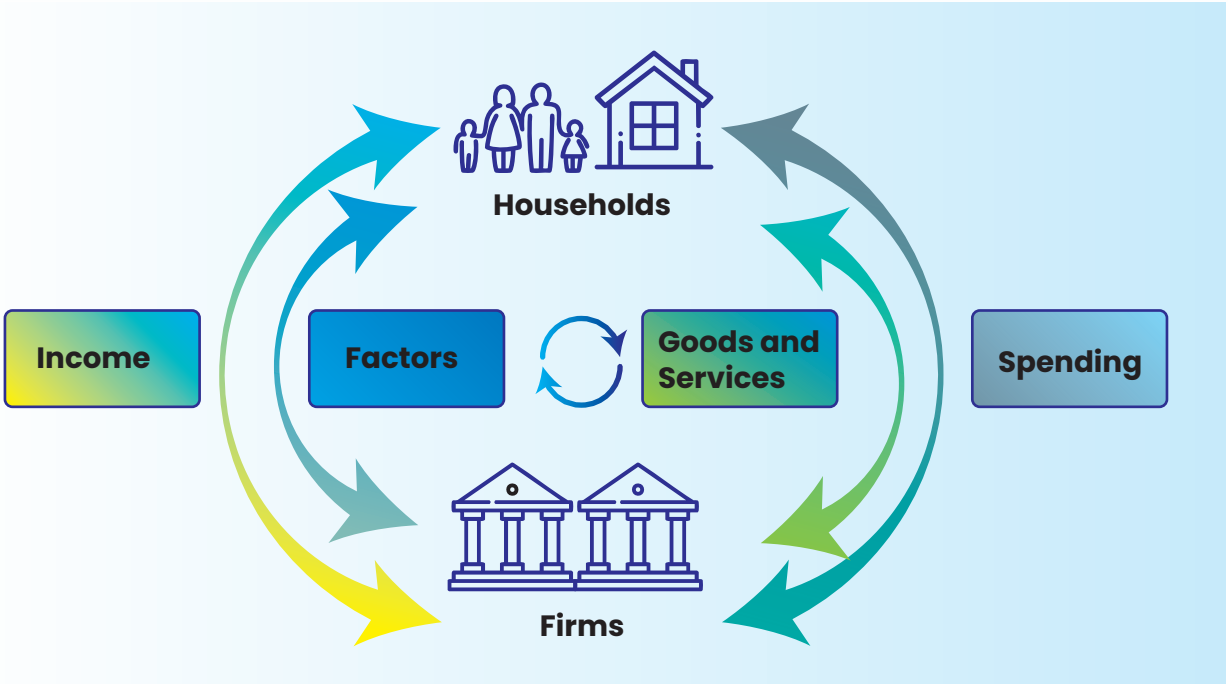


Figure 10: Economic Cycles

Characteristics of the cycles3

Expansion (Recovery):	**Peak**	**Recession**	**Trough**
Characterised by economic growth.	**The highest point of economic activity.**	**Period of economic decline.**	**The lowest point of economic activity.**
Increasing employment, production, and consumer spending.	Full employment, high production levels, and strong consumer demand.	Falling GDP, rising unemployment, decreased consumer spending.	High unemployment, low production, and weak consumer demand.
Generally accompanied by rising stock markets and business confidence.	Often marked by inflationary pressures.	Businesses may cut back on investment and production.	Also called the depression phase if severe and prolonged.

[3] *You can watch a simple video that illustrates this in Investopedia; 4 stages of the economic cycle; https: //www.investopedia.com/terms/e/economic-cycle.asp*

B2. Demand and supply in the economy

2.1 Supply and demand

2.1.1 Aggregate Demand

Key Term	**Aggregate demand (AD)** or total demand is a macroeconomic concept that represents the total demand for goods and services within an economy at a given time and price level.

Understanding aggregate demand is crucial for analysing economic performance and predicting future trends. As a key component of GDP calculation, it provides insights into consumer spending, business investment, government expenditure, and net exports.

By studying aggregate demand, policymakers and economists can develop strategies to stimulate growth, manage inflation, and address economic challenges, ultimately shaping fiscal and monetary policies to promote overall economic well-being. Aggregate demand is closely related to Gross Domestic Product (GDP). In fact, in a closed economy (with no imports and exports) at equilibrium, aggregate demand equals GDP.

The demand curve

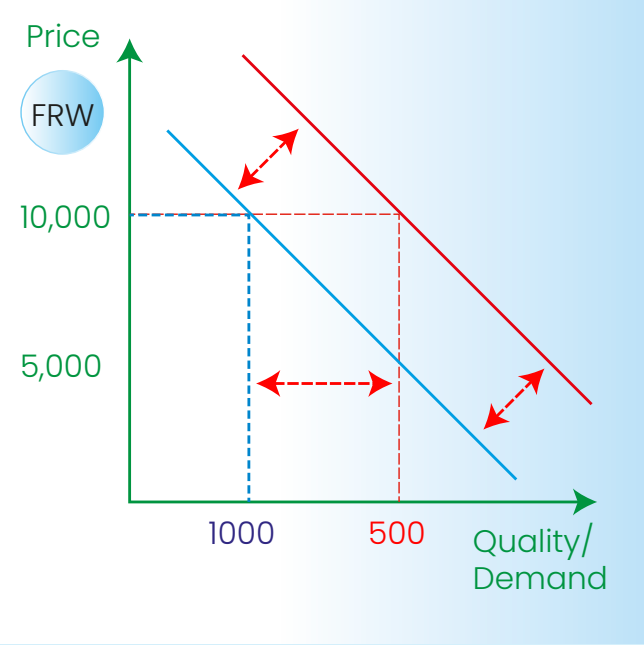
The downward slope of the demand curve indicates that there is an inverse relationship between price and quantity demanded. When prices fall, more consumers are willing to buy the good, increasing the quantity demanded. Conversely, when prices rise, the quantity demanded tends to decrease.

The demand curve diagram illustrates the impact of a change in price on the demand of a product. If a product currently has a price of FRW10,000 and 200 people want it (demand), a price drop to FRW5,000 will see an increase of demand, in this case 500. This means that an extra 300 people would be willing to buy this product now that it is half of the price that it was. The number of people who will be willing to buy the product will depend on the price elasticity4 of the product. For example, the demand for water and electricity is different from the demand of bread and food items like Coca-Cola. They have deferent price elasticities.

[4] *Price elasticity of demand measures the percentage change in quantity demanded in response to a percentage change in price. It's calculated as: (Percentage change in quantity demanded) / (Percentage change in price). Find out more on Investopedia.com*

Factors influencing Demand

Movement Along the curve	Example
 This occurs when the price of the good itself changes, leading to a change in the quantity demanded.	For example, a **rise in coffee prices** due to a poor harvest leads to a **movement along the demand curve**, not a shift. As prices increase, consumers buy less coffee or switch to substitutes, resulting in a lower quantity demanded. Conversely, if **coffee prices drop** due to a bumper crop, it becomes more affordable, leading to an **increase in quantity demanded**. These changes illustrate movements along the demand curve, with higher prices reducing demand and lower prices increasing it, rather than shifting the curve itself.

Shift in Demand	Examples
 This is caused by a change in demand due to other factors other than the price of the good itself. For example, more people buying the product at the same price.	• **Income:** If consumers' incomes increase, they may buy more of a good even at the same price, shifting the demand curve to the right. • **Preferences:** Changes in consumer preferences, such as a new trend, can increase demand, shifting the curve to the right. • **Prices of Related Goods:** If the price of a substitute good rises, the demand for the original good might increase, shifting the curve to the right. If a complement's price rises, demand for the original good might decrease, shifting the curve to the left. • **Expectations:** expectation of future price increases- increases current demand. • **Population:** increase in population shifts the demand curve to the right.
Leftward Shift (Decrease in Demand)	**Causes of a Rightward Shift**
The demand curve shifts to the left when there is a **decrease in demand.** This indicates that at every price level, consumers are now willing to purchase a smaller quantity of the good or service. Causes of a Leftward Shift: **Decrease in Income:** For normal goods, a reduction in consumers' income leads to less demand at any given price.	• **Increase in Income:** For normal goods, when consumers' income rises, they tend to buy more of a good at any given price. • **Positive Change in Tastes or Preferences:** If a product becomes more popular due to trends, advertising, or changes in consumer preferences, more people will want to buy it.

- **Negati**ve Change in Tastes or Preferences: If a product falls out of favour or is perceived as less desirable, fewer people will want to buy it.
- Price of Substitutes Decreases: If a substitute good becomes cheaper, consumers may switch to that alternative, decreasing demand for the original good.
- Price of Complements Increases: If a complementary good becomes more expensive, demand for the related good may decrease.
- Expectations of Future Price Decreases: If consumers expect prices to fall in the future, they may delay purchases, reducing current demand.
- Populatio**n Decline:** A decrease in the number of consumers in the market leads to lower demand.
- **Price of Substitutes Increases:** If the price of a substitute good (a similar product) rises, consumers may switch to the good in question, increasing its demand.
- **Price of Complements Decreases:** If a complementary good (a product that is used together with the good in question) becomes cheaper, the demand for the original good might increase.
- **Expectations of Future Price Increases:** If consumers expect prices to rise in the future, they may buy more now, increasing current demand.
- **Population Growth:** An increase in the number of consumers in the market will lead to higher demand.

Imagine the demand for electric cars. If the government offers a significant tax credit for purchasing electric cars, **more consumers might decide to buy them**, even if the price of the cars remains the same. This would **shift** the demand curve for electric cars **to the right**, indicating an increase in demand. However, if the government removes the tax credit, the demand curve could shift to the left, as fewer consumers might be willing to purchase electric cars at the current prices.

Summary:

A shift in the demand curve reflects a change in market conditions that affects the overall demand for a product or service, independent of its price. A rightward shift indicates an increase in demand, while a leftward shift indicates a decrease in demand.

2.1.2 Aggregate Supply

Key Term

Aggregate supply (AS) is the total quantity of goods and services that all firms in an economy are willing and able to produce and sell at a given price level.

Studying aggregate supply is essential for understanding economic productivity and growth potential. It reflects an economy's capacity to produce goods and services, influenced by factors like technology, resource availability, and production costs. Understanding aggregate supply helps policymakers and businesses make informed

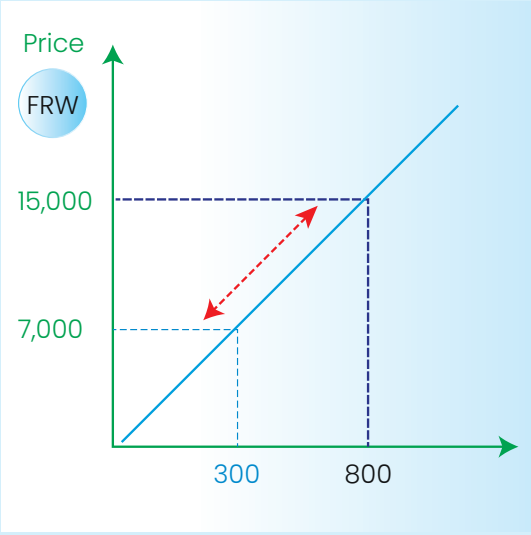
decisions about resource allocation, pricing strategies, and long-term economic planning, ultimately impacting living standards and economic development.

The supply curve

The supply curve is a graphical representation that shows the relationship between the price of a good or service and the quantity supplied by producers at various price levels. Typically, the supply curve is upward sloping, reflecting the basic economic principle of the law of supply: as the price of a good or service increases, the quantity supplied by producers generally increases, and vice versa.

The supply curve diagram illustrates the impact of a change in price on the willingness to supply by suppliers of a product. If a product currently has a price of FRW7,000 and suppliers are willing to produce 300 (supply), a price increases to FRW15,000 will see an increase of supply, in this case to 800. This means that suppliers are willing to produce an extra 500 units of this product now that price has more than doubled. The increase in supplier will also depend on the price elasticity of the product.

Movement Along the curve



This occurs when the price of the good itself changes, leading to a change in the quantity supplied.

Example

For example, a rise in coffee prices due to a poor harvest leads to a movement along the supply curve, not a shift. When the harvest is poor, the **supply of coffee decreases**, causing **prices to rise**. As the price increases, suppliers are willing to **produce and sell more coffee**, resulting in a higher quantity supplied. Conversely, if there is a **bumper crop**, the **supply increases**, leading to **lower prices.** At these lower prices, suppliers produce less, resulting in a lower quantity supplied. These changes represent movements along the supply curve, with price changes driving the quantity supplied up or down.

Factors influencing Demand

Shift in Supply	Examples
	The supply curve can shift to the right or left due to various factors other than price, such as: **Input Costs:** If the cost of production (e.g., raw materials, labour) decreases, producers can supply more at the same price, shifting the curve to the right. **Technology:** Advances in technology, reduced costs- shift to the right **Number of Sellers:** More producers- shift to the right. **Expectations:** higher prices in the future- shift the curve to the left. **Government Policies:** Taxes, subsidies, and regulations can affect production costs and incentives, leading to shifts in supply.
Leftward Shift (Decrease in Supply)	Rightward Shift (Increase in Supply)
• The supply curve shifts to the left when there is a decrease in supply. This indicates that at every price level, producers are now willing to **supply a smaller quantity** of the good or service. Causes of a Leftward Shift: • **Increase in Input Costs.** • **Technological Decline or Failures.** • **Decrease in the Number of Producers.**	The supply curve shifts to the right when there is an increase in supply. This means that at every price level, producers are now willing to **supply a larger quantity** of the good or service. **Causes of a Rightward Shift:** • Decrease in Input Costs. • Technological Advancements. • Increase in the Number of Producers. • Government Subsidies. • Favourable Weather (for agricultural products): Good weather can increase crop yields, leading to more supply.

2.2 Circular flow of income

The circular flow of income is a fundamental concept that describes how money moves through an economy. It illustrates the interactions between different sectors (households, firms, government, etc.) and how these interactions create income and expenditure flows that sustain the economy. Let's build up the model progressively.

i. Simple Circular Flow (No Withdrawals, No Injections)

In the simplest model, the economy consists of just two sectors: households and firms.

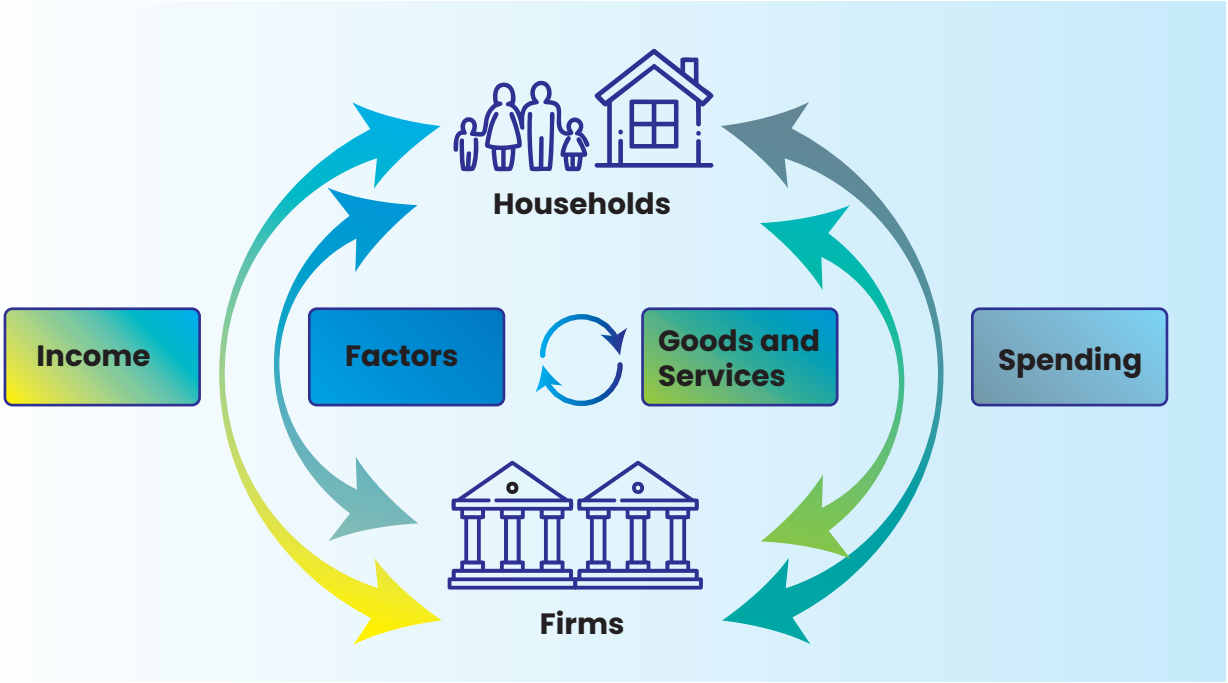


Figure 11: The circular flow of income-no withdrawals/injections

Households: Own all the factors of production (labour, capital, land, entrepreneurship) and supply them to firms.

Firms: Use these factors of production to produce goods and services.

Flow of Income: Households provide factors of production to firms (e.g., labour).

- Firms pay households for these factors of production (wages, rent, interest, profits), creating income for households.
- Households spend their income on goods and services produced by firms.
- Firms receive this spending as revenue, which they use to pay for factors of production, completing the cycle.

In this simple model:

- All income received by households is spent on goods and services.
- All revenue received by firms is paid out as income to households.
- The economy is in equilibrium: total income = total output = total expenditure.

ii. Introducing Withdrawals (Leakages)

Now let's consider a more realistic scenario where not all household income is spent on goods and services produced by firms. Some of it is withdrawn (leaked) from the circular flow. There are three main types of withdrawals:

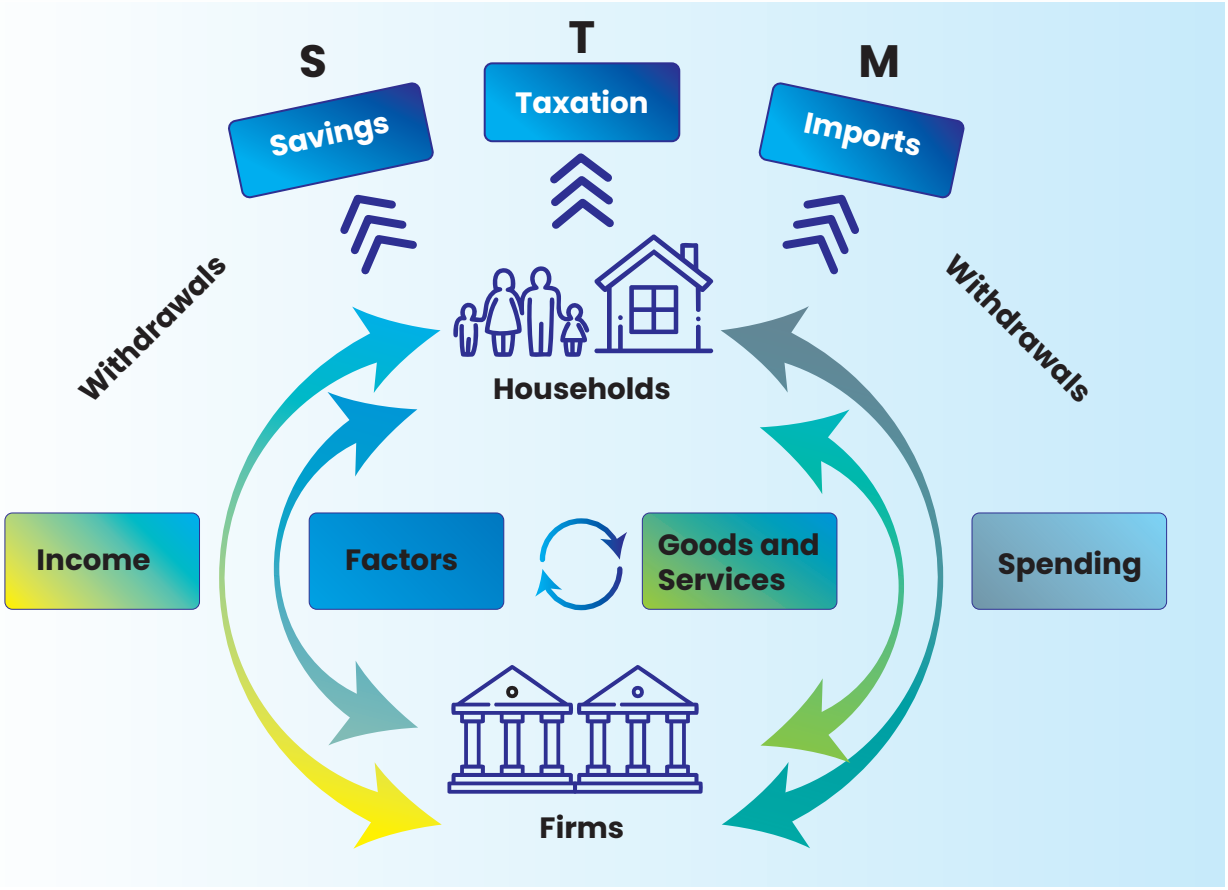


Figure 12: Withdrawals from the circular flow of income

- Savings (S): Households save part of their income instead of spending it.
- Taxes (T): The government takes a portion of household income as taxes.
- Imports (M): Households spend part of their income on goods and services produced abroad.

Impact on the Circular Flow

- Savings: Income that households save does not return immediately to firms through consumption.
- Taxes: Income paid as taxes goes to the government rather than being spent on goods and services.
- Imports: Spending on imports sends money out of the domestic economy to foreign firms.

With these withdrawals, the circular flow is no longer a simple loop. If withdrawals increase, firms receive less revenue, which could lead to a decrease in production and potentially lower income for households.

iii. Introducing Injections

To balance the withdrawals, we introduce injections, which are flows of money into the economy that do not originate from domestic consumption. There are three main types of injections:

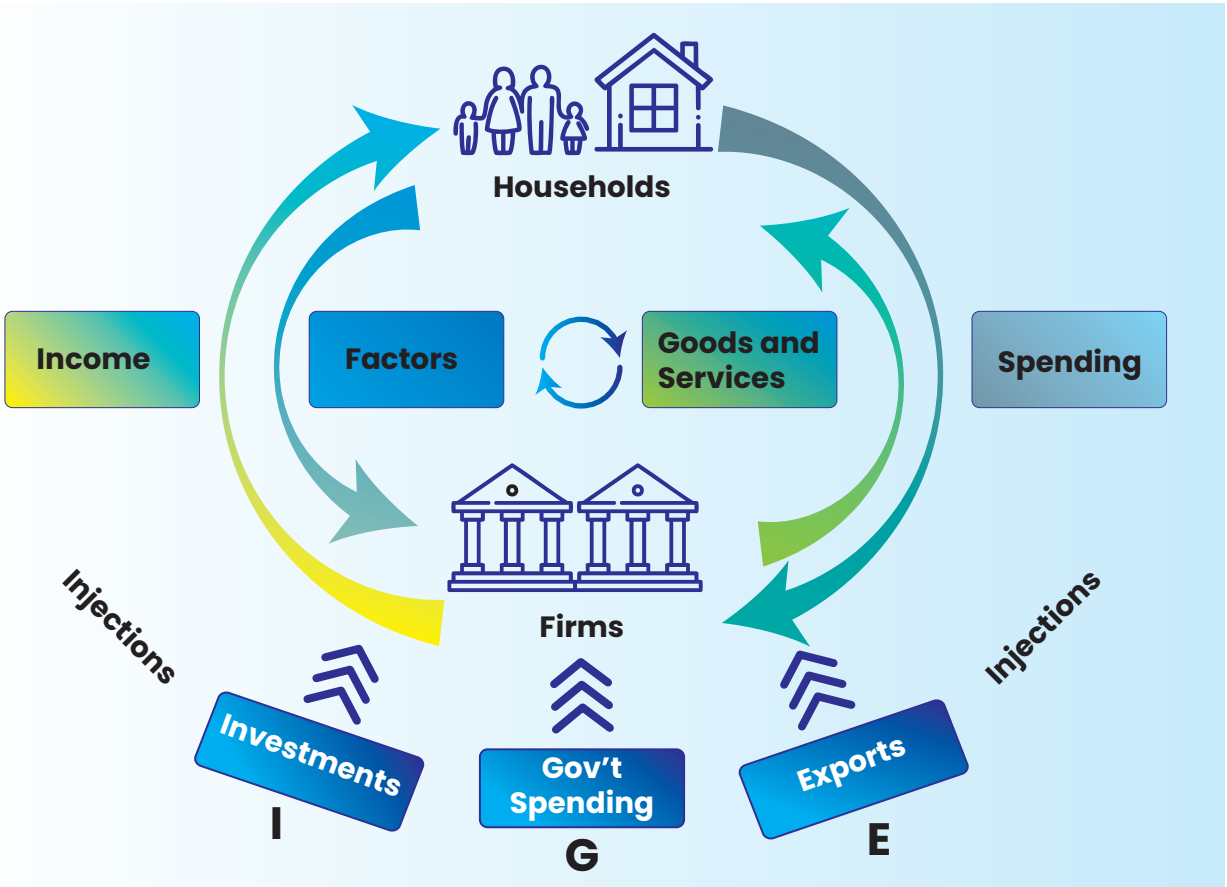


Figure 13: Injections to the circular flow of income

- Investment (I): Firms borrow money (from household savings) to invest in capital goods, which leads to future production.
- Government Spending (G): The government uses tax revenue to spend on goods and services (infrastructure, public services, etc.).
- Exports (X): Domestic firms sell goods and services abroad, bringing money into the economy.

Impact on the Circular Flow:

- Investment: Increases firms' capacity to produce, leading to more income for households.
- Government Spending: Increases demand for goods and services, leading to higher income for firms and households.
- Exports: Bring in income from foreign buyers, boosting domestic firms' revenue.

iv. The Complete Circular Flow with Withdrawals and Injections

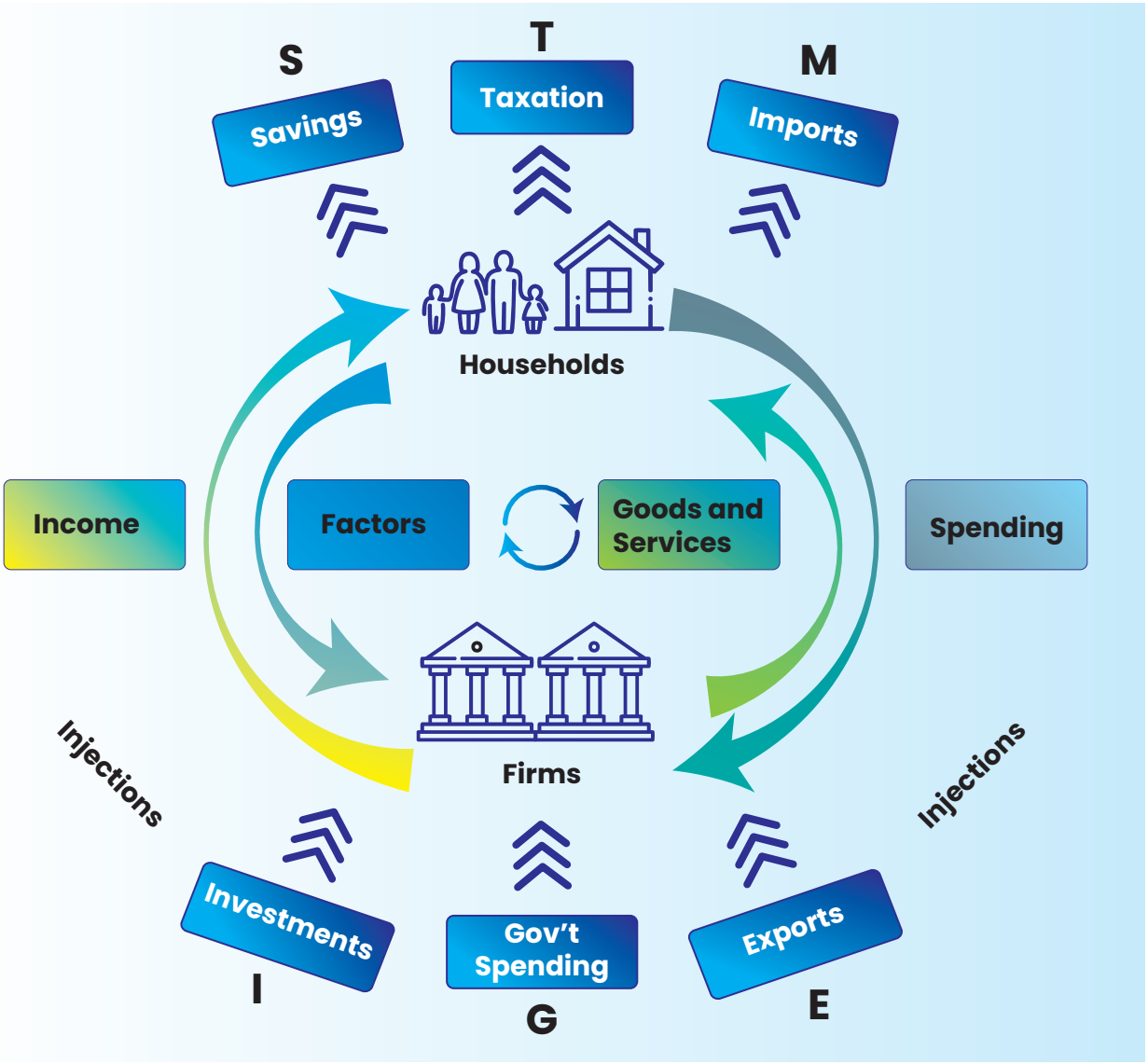


Figure 14: Full circular flow of income

In a full model of the circular flow of income:

- Households receive income from firms and spend it on goods and services (consumption, C), but part of this income is withdrawn as savings (S), taxes (T), or imports (M).
- Firms receive income from selling goods and services to households, the government, and foreign buyers (exports, X). They also receive money from investments (I).
- The Government collects taxes (T) and injects money into the economy through government spending (G).
- The Financial Sector facilitates the flow of savings into investment (S -> I).
- The Foreign Sector interacts through imports (M) and exports (X)

The economy is in equilibrium when:

formulae	Equilibrium is when C + I + G + X = C+S+T+M			Or I+G+X=S+T+M
	C	I	G	X
	Consumption	Investment	Government Spending	Exports
	C	S	T	M
	Consumption	Savings	Tax	Imports

The total injections (I + G + X) must equal total withdrawals (S + T + M) for the economy to be in equilibrium.

If injections exceed withdrawals (Injections>Withdrawals), the economy may grow (expansion).

If withdrawals exceed injections (Injections<Withdrawals), the economy may contract (recession).

This model demonstrates how the circular flow of income balances and adjusts, reflecting the complex interdependencies in a real-world economy.

2.2.1 Numerical example of Circular Flow of Income

Let's look at a numerical example to illustrate the circular flow of income with households, firms, withdrawals (leakages), and injections.

Step 1: Simple Circular Flow (No Withdrawals, No Injections)

Let's assume:

- Household Income = FRW100,000
- Household Consumption (C) = FRW100,000
- Firm Revenue = FRW100,000
- Firm Expenditures on Wages, Rent, etc. = FRW100,000

In this basic scenario:

Households receive FRW1000 as income from firms (for providing labour, capital, etc.).

Households spend all FRW1000 on goods and services produced by firms.

Firms receive FRW1000 as revenue and use it to pay wages, rent, etc., back to households.

Circular Flow:

formulae	Total Income = FRW100,000	Total Expenditure = FRW100,000	Total Output = FRW100,000

The economy is in equilibrium.

Step 2: Introducing Withdrawals (Leakages)

Now let's assume households do not spend all of their income. Instead, some of it is withdrawn:

Household Income = FRW1000	
Household Consumption (C) = FRW70,000	Households spend FRW70,000 on goods and services.
Savings (S) = FRW15,000	FRW15,000 is saved (not spent on goods and services).
Taxes (T) = FRW10,000	FRW10,000 is paid as taxes to the government.
Imports (M) = FRW5,000	FRW5,000 is spent on imported goods.

Impact on the Circular Flow:

- Firms only receive FRW70,000 from household spending instead of FRW100,000.
- The difference (FRW30,000) represents the withdrawals (S + T + M = FRW 15,000 + FRW10,000 + FRW5,000).

Step 3: Introducing Injections

Now, let's balance the withdrawals with injections:

Investment (I) = FRW15,000	Firms receive an additional FRW15,000 from investment (e.g., firms borrowing from the savings of households).
Government Spending (G) = FRW10,000	The government spends FRW10,000 on goods and services, injecting money back into the economy.
Exports (X) = FRW5,000	Domestic firms receive FRW5,000 from selling goods abroad (exports).

Circular Flow with Injections and Withdrawals:

Household Income = FRW100,000 Household Consumption (C) = FRW70,000

Withdrawals (S + T + M) = FRW30,000 Injections (I + G + X) = FRW30,000

Balance: Total Withdrawals = FRW30,000 = Total Injections = FRW30,000

Total Firm Revenue = FRW70,000 (from household consumption) + FRW15,000 (investment) + FRW10,000 (government spending) + FRW5,000 (exports) = FRW100,000

Final Equilibrium

In this expanded model:

The total income, total output, and total expenditure are again balanced at FRW100,000, but now the economy includes the complexity of withdrawals and injections.

The equilibrium condition is maintained:

formulae	Equilibrium is when C + I + G + X = C+S+T+M			Or I+G+X=S+T+M
	C	I	G	X
	Consumption =70,000	Investment =15,000	Government Spending =10,000	Exports =5,000
	C	S	T	M
	Consumption =70,000	Savings = 15,000	Tax =10,000	Imports =5,000

The economy is in equilibrium, demonstrating how injections counterbalance withdrawals, allowing the circular flow of income to sustain the economy.

B3. Monetary policy

3.1 Monetary Policy

Now that we have seen how GDP is measured and factors that have an impact of the GDP in the form of withdrawals and injections in the circular flow of income. Let's us now consider how the government can use monetary policy as a control mechanism through a policy called Quantitative Easing. But first let's look at interest rates and understand how they can affect supply and demand.

3.1.1 Interest rates

Interest represents the cost of borrowing money or the return on saving money, typically quoted as an annual percentage rate (APR). For example, if a household deposits FRW10,000 in a bank account with a 3% annual interest rate, they will have FRW10,300 after one year. This rate influences how money moves through the economy, as described by the circular flow of income model.

When households save money, it represents a withdrawal from the circular flow, potentially slowing economic activity. The government, usually through its central bank, can manipulate interest rates to influence economic behaviour. Lower rates encourage spending and investment by making saving less attractive and borrowing more affordable, while higher rates do the opposite. To maintain economic equilibrium, the government aims to balance withdrawals (like savings) with injections (like investment). For instance, if households save FRW10,000, the government might try to encourage businesses to invest an equivalent amount. These changes in spending or saving can have a multiplied effect on the overall economy, making interest rates a powerful tool in economic management.

Here are a few examples of how lower/higher interest rates can impact

	Lower Interest rates	Higher Interest rates
Effects on Supply and Demand	This will encourage borrowing and spending.	As interest gets expensive this will discourage borrowing and promote saving.
Business Investment	This will encourage businesses borrow and invest and stimulating investments.	The cost of capital increases, discouraging investment; reduce investment.
Housing Market	Increase demand for housing, as mortgages become more affordable.	Decrease housing demand, as mortgages become more expensive.
Exchange Rates	May lead to currency depreciation, potentially boosting exports.	May lead to currency appreciation, potentially reducing exports.
Overall Economic Impact	Generally, stimulate economic activity and inflation.	Slows down economic activity and reduces inflation.

3.1.2 Quantitative Easing

Quantitative easing is a monetary policy tool used by central banks when traditional interest rate adjustments are insufficient to stimulate the economy. It involves the central bank purchasing large quantities of government bonds or other financial assets to inject money directly into the economy thereby increasing injections into the circular flow. The purpose of this is to increase the money supply in the economy which lowers the long-term interest rates, when interest rates are low (see section 3.1.1), this will encourage lending and investments which we saw has an effect of expanding the economy.

Quantitative easing is typically used in exceptional circumstances, such as during severe economic downturns or when interest rates are already very low.

Key Aspects of Quantitative Easing

Aspect	Explanation
Purpose	To increase the money supply, lower long-term interest rates, and encourage lending and investment.
Implementation	The central bank creates new electronic money to purchase assets, typically government bonds, from financial institutions.
Effects	This will increase liquidity (liquid cash) in the financial system, lowering long-term interest rates, which can lead to currency depreciation, boosting spending, investment, and inflation.
Risks	The key risks include a concern for potential for asset bubbles, the risk of higher long-term inflation, and a possible increase in wealth inequality.

B4. Fiscal policy

3.2 Fiscal Policy

Fiscal Policy refers a key tool used by governments to achieve macroeconomic objectives such as economic growth, price stability, and full employment using government spending (G) and taxation(T) to influence the economy. The government needs to balance these two to ensure that injections in the form of government spending outweigh taxation which is a withdrawal from the circular flow.

Aspect	Government policy exercises
Government spending	Here the government will look to adjust the allocation of government expenditures on goods, services, and transfer payments. This includes areas like infrastructure projects on public services and social welfare programs. Public services like education, healthcare, defence are fundamental to the economy and hence need careful monitoring by the government.
Taxation	Here the government will look at adjusting tax rates and their structures to influence economic behaviour and redistribute income. Income taxes include corporate, sales and property taxes.
Transfer payments	These are direct payments from the government to individuals or groups in the form of social security, unemployment benefits and subsidies.
Government borrowing	Issuing government bonds to finance spending when tax revenues are insufficient.

Fiscal policy can be either expansionary or contractionary:

3.2.1 Expansionary Fiscal Policy

An Expansionary Fiscal Policy is a policy where government takes action to stimulate economic growth during periods of economic recession. This done by increasing government spending and/or reduces taxes to stimulate economic growth. The main tools used to do this is increasing government spending (G), tax cuts and increasing transfer payments. The main aim of an expansionary policy is to stimulate growth, reduce unemployment, increase customer spending and business investment.

The result of expansionary fiscal policy is typically a fiscal deficit. A fiscal deficit occurs when government spending (G) exceeds tax revenue (T), represented as G > T. This aligns with the circular flow of income model, which suggests that when injections into the economy (such as government spending) exceed withdrawals (like taxation), there is economic growth. This growth is precisely the aim of expansionary fiscal policy. By intentionally creating a deficit, the government injects more money into the economy than it withdraws, stimulating economic activity and fostering expansion.

3.2.2 Contractionary Fiscal Policy

A Contractionary Fiscal Policy is a strategy employed by governments to slow down economic growth during periods of excessive inflation or an overheating economy. This is achieved by decreasing government spending and/or increasing taxes to reduce overall economic activity. The main tools used to implement this policy are reducing government expenditure (G), raising tax rates, and decreasing transfer payments. The primary objectives of a contractionary policy are to control inflation, cool down rapid economic growth, reduce budget deficits, and maintain economic stability.

The result of contractionary fiscal policy is typically a fiscal surplus or a reduced deficit. A fiscal surplus occurs when government revenue, primarily from taxation (T), exceeds government spending (G), represented as T > G. This aligns with the circular flow of income model, which suggests that when withdrawals from the economy (such as taxation) exceed injections (like government spending), economic activity tends to slow down. This cooling effect is precisely the aim of contractionary fiscal policy. By intentionally creating a surplus or reducing a deficit, the government removes more money from the economy than it injects, dampening economic activity and helping to control inflation.

It's important to note that while contractionary fiscal policy can be effective in managing an overheating economy, it must be implemented carefully to avoid triggering a recession. The timing and magnitude of such policies are crucial for maintaining economic balance.

B6. Market structures

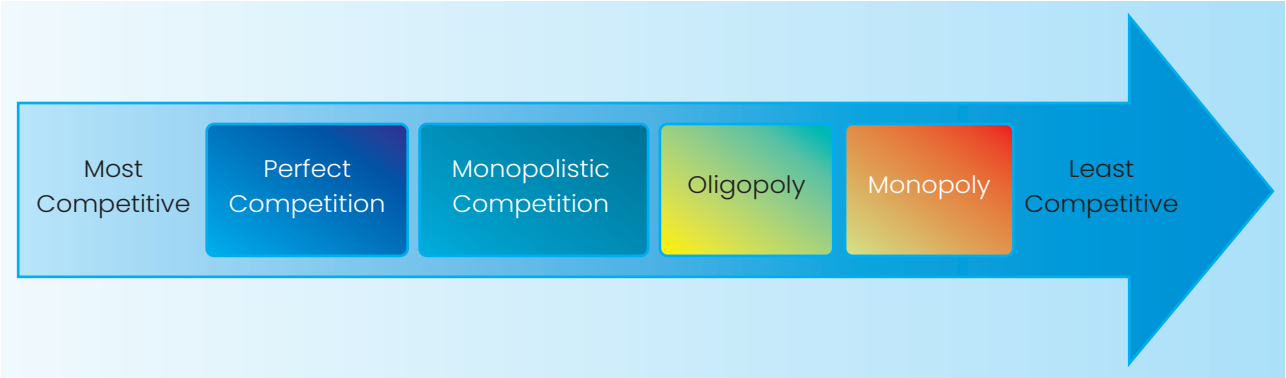


Figure 15: Market Structures

4.1 Market Structures

Studying market structures is vital to understanding economics because this provides vital insights into how industries function and compete. Market structures illuminate pricing behaviours, resource allocation efficiency, and innovation incentives within various economic contexts. They also significantly impact consumer welfare, inform policy decisions, and shape firm strategies. By understanding different market structures—from perfect competition to monopolies—we can better grasp how these frameworks influence pricing, output decisions, and overall market dynamics. This knowledge is essential for comprehending the complexities of modern economies and making informed economic decisions.

4.1.1 Perfect Competition

Key Term	Perfect competition: a theoretical market structure in which no supplier has an advantage over another. (BPP Media, 2010)

Once we know what perfect competition looks like, we can use this as a benchmark for understand what an idea market should look like to then understand what an imperfect market is and when there is market failure.

Key characteristics of perfect competition

- Many buyers and sellers- they can trade as much as they want, prices are determined by the supply and demand.
- Homogeneous products- one unit of the product is the same as any other unit.
- Perfect information- buyers and sellers have the same information, no is at an advantage.
- No barriers to entry or exit- anyone can enter/leave the market with no restrictions.
- Firms are price takers- this means that firms do not set the price, they simply sell at the price the market set through the mechanisms of supply and demand.

Implications for stakeholders

Aspect	Implications
Consumers	Consumers benefit from lower prices, have many choices among sellers, and receive standardised products.
Employees:	Workers in highly competitive markets may face pressure on wages due to firms' focus on cost reduction and could experience job insecurity if their employer is inefficient.
Investors:	Investors typically receive normal returns on investment and face lower risk due to market stability, but also experience lower potential rewards.
Suppliers:	Firms may face pressure to reduce prices but have access to many potential customers.
Government:	Governments have less need for regulation due to the self-regulating nature of the market but may focus on maintaining conditions for perfect competition.
Society:	Society benefits from efficient resource allocation in competitive markets but may see reduced innovation in perfectly competitive industries.

4.1.2 Market Imperfection

Market imperfections refer to situations where the conditions for a perfectly competitive market are not met, leading to inefficiencies in resource allocation. Here's a concise overview of some key market imperfections:

Aspect	Implications
Asymmetric information	This is when one party in a transaction has more or better information than the other.
Externalities	When the production or consumption of a good affects third parties not involved in the transaction. For example, a factory can produce products that has hazardous waste which can affect villagers in a village which does not consume the product.
Market power	When a firm or group of firms can influence market prices. This means that the price mechanism of supply and demand would have failed.

Aspect	Implications
Public goods	Public goods are goods everyone can use without using them up or stopping others from using them. Examples are streetlights or clean air. Because it's hard to make money from these, companies might not make enough of them. This is why the government often steps in to provide public goods.
Incomplete markets	There is a potential for certain goods or services to be missing since most firms will go for high return goods.
Transaction costs	Costs associated with participating in a market that can hinder efficient outcomes.

These imperfections can lead to market failures, where the free market fails to allocate resources efficiently. Governments often intervene to address these issues through regulation, taxation, or direct provision of goods and services.

4.1.3 Role of the Government

When the market fails/when there are market imperfections in the economy, the government will intervene. This is often justified to address market imperfections and enhance economic outcomes. This intervention takes various forms, including regulation, fiscal policy, monetary policy, and direct provision of goods and services. Regulatory measures involve setting standards, enforcing competition laws, and managing licensing.

Fiscal policy encompasses taxation to internalise externalities, subsidies to encourage positive externalities, and government spending on public goods. Monetary policy focuses on interest rate adjustments, money supply control, and exchange rate management. Governments also directly provide essential services like education, healthcare, and infrastructure.

Other interventions include information provision through consumer protection laws and public awareness campaigns, market creation and support via cap-and-trade systems and intellectual property rights, income redistribution through progressive taxation and social welfare programs, and antitrust measures to maintain competitive markets. These diverse tools allow governments to shape economic landscapes, correct market failures, and promote societal welfare.

While intervention can address market failures, it may also introduce inefficiencies or unintended consequences. The effectiveness of government intervention is often debated among economists and policymakers.

4.2. Market Competition

4.2.1 Monopoly

 **Key Term**	Monopoly is a market structure characterised by a single seller dominating an entire industry or market. (BPP Media, 2010)

In a monopoly, there is only one firm, the sole producer of a good which has no closely competing substitutes. A monopoly can be because of a variety of factors which include, naturally occurring restrictions due to factors like weather and geographical location or by design or manipulation.

Examples of Monopolies

1. Historical: Standard Oil (before 1911 breakup).
2. Utilities: Local water or electricity providers.
3. Technology: Microsoft Windows (in personal computer operating systems, during the 1990s).
4. Pharmaceuticals: Drug companies with patent protection for specific medications.

A monopoly is characterised by a single seller dominating a market with no close substitutes for its product and high barriers to entry. This allows the monopolist to be a price maker. Monopolies can arise due to control over key resources, economies of scale, network effects, legal barriers like patents or licenses, or in cases of natural monopolies with high fixed costs and decreasing average costs. The economic effects of monopolies include higher prices compared to competitive markets, reduced output, deadweight loss resulting in economic inefficiency, and potential for reduced innovation. Monopolists typically maximise profits by producing at the point where marginal revenue equals marginal cost, which differs from the competitive market equilibrium.

Advantages	Disadvantages
Economies of scale can lead to lower costs.	There is potential for consumer exploitation.
Potential for increased R&D spending.	Inefficient resource allocation.
Stability in essential industries.	Potential for reduced quality or innovation.
Price control: Ability to set prices above marginal cost.	Political pressure: May face calls for regulation or breakup

Government responses

In the event of a monopoly causing market imperfections, the government can intervene in the following ways.

- Introduction of Antitrust laws and enforcement.
- Regulation of prices and quality.
- Encouraging competition through regulation and anti-monopoly laws.
- Public ownership in some cases.

4.2.2 Oligopoly

 **Key Term**	An oligopoly is a market structure characterised by a small number of large firms dominating an industry. (BPP Media, 2010)

In an oligopoly, there are a few large firms dominating the market, each with significant market power. These firms produce similar or identical products and are interdependent, meaning their decisions affect each other. Oligopolies can arise due to high barriers to entry, economies of scale, or mergers and acquisitions.

Examples of Oligopolies

1. Telecommunications: Major mobile network providers.
2. Automotive: Large car manufacturers.
3. Technology: Social media platforms (Facebook, Twitter, LinkedIn).
4. Aviation: Major airlines in domestic markets.
5. Smartphone operating systems (iOS and Android)
6. Commercial aircraft manufacturing (Boeing and Airbus)
7. Soft drink industry (Coca-Cola and Pepsi)

An oligopoly is characterised by a small number of large firms controlling a significant portion of the market. These firms are aware of their interdependence and often engage in strategic decision-making, considering competitors' potential reactions. This can lead to price leadership, collusion, or non-price competition. Oligopolies can arise due to high capital requirements, brand loyalty, or regulatory barriers. The economic effects of oligopolies include prices higher than perfect competition but often lower than monopolies, potential for product differentiation, and a mix of price and non-price competition. Firms in oligopolies typically make decisions based on game theory principles, balancing cooperation and competition.

4.2.2 Differentiation

 **Key Term**	An oligopoly is a market structure characterised by a small number of large firms dominating an industry. (BPP Media, 2010)

Differentiation in economics and business refers to strategies that firms use to distinguish their products or services from those of competitors

Types of differentiation:

Horizontal:	Different features appeal to different consumers.
Vertical:	Products differ in quality or desirability.
Mixed:	Combination of horizontal and vertical differentiation.

Methods of differentiation:

Method	Example
Physical characteristics	Apple's sleek, minimalist product designs.
Branding and image	Nike's "Just Do It" slogan and swoosh logo.
Customer service	Safaricom's M-PESA mobile money service in Kenya; 24/7 customer support in multiple local languages.
Location	Nando's strategic restaurant placements in South Africa; Positioned in high-traffic areas of major cities like Johannesburg, Cape Town, and Durban.
Packaging	Ghandour Cosmetics' Black Secret Soap from Ghana; Ghandour's Black Secret Soap uses calabash-shaped soap wrapped in plantain leaves, tied with twine, emphasising tradition and eco-friendliness in West Africa.
Performance or functionality	Tesla's long-range electric vehicles.
Customisation options	Kigali Crafts Village's made-to-order Imigongo art.

Economic implications

Differentiation strategies reduce price competition and enable potential price premiums. This approach facilitates market segmentation, offering increased consumer choice. The result is often a landscape of monopolistic competition, where firms carve out unique niches based on their differentiated offerings.

This expands consumer choice, offering a wider array of options tailored to diverse preferences. While this may lead to higher prices, it enables consumers to find products that more closely align with their specific needs and desires, potentially increasing overall satisfaction.

Advantages and Disadvantages of Differentiation

Advantages for firms:	Disadvantages
This creates brand loyalty.	There are costs associated with R&D and marketing.
Higher profit margins.	There is risk of failed differentiation attempts
Increases the company's market power.	There can be difficulty in maintaining uniqueness due to competitors copying or creating similar products
Creates barriers to entry for competitors.	

Real world Example
A prime example of a company that differentiated itself and changed the market is Apple with the introduction of the iPhone in 2007. Before the iPhone, the mobile phone market was dominated by devices primarily focused on calls and text messages, with some limited internet capabilities. Smartphones existed, but they typically had physical keyboards and styluses for interaction.
Apple's differentiation strategy included: Revolutionary user interface: The iPhone introduced a full touchscreen interface with intuitive gestures, eliminating the need for a physical keyboard or stylus. App ecosystem: Apple created the App Store, allowing third-party developers to create and sell applications, which greatly expanded the device's functionality. Design and build quality: The iPhone featured a sleek, minimalist design with premium materials, setting a new standard for smartphone aesthetics. Integration with existing services: Seamless synchronization with iTunes and other Apple services enhanced the user experience.

Real world Example

Marketing: Apple's marketing strategy positioned the iPhone as a revolutionary product, creating massive consumer interest and demand.

Apple's differentiation with the iPhone not only disrupted the existing market but also created new markets for mobile applications and services, reshaping the entire mobile technology landscape.

4.3. Market Imperfections

4.3.1 Collusion

Keys Term

Collusive behaviour occurs when firms in an oligopoly cooperate to restrict output and raise prices, aiming to maximise joint profits. (BPP Media, 2010)

Collusion is illegal in many countries as it involves firms cooperating to restrict output, control the market, and manipulate prices, ultimately harming consumers. This practice is considered anti-competitive behaviour, as it undermines the principles of fair market competition. The diagram below illustrates the spectrum ranging from collusion at one end to a market with no collusion or control by a few companies at the other end.

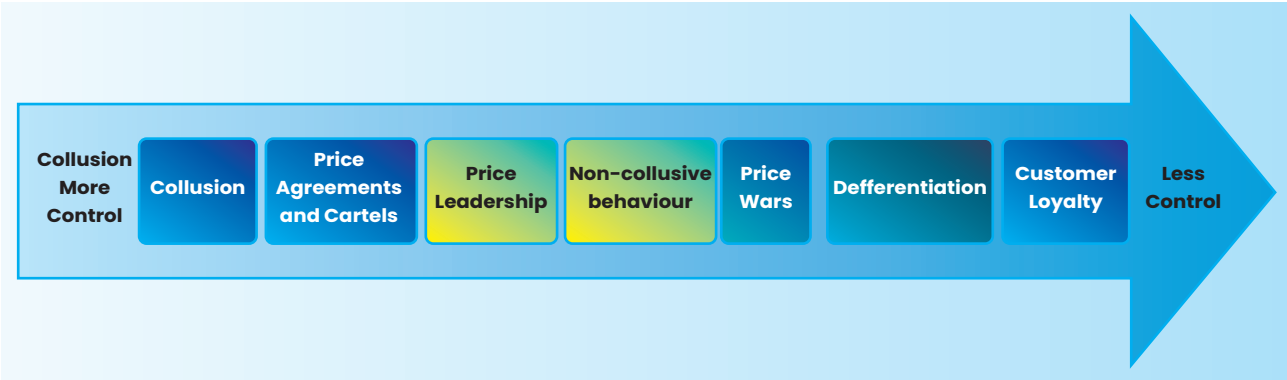


Figure 16: Spectrum of control from collusion to customer loyalty

Main features of each strategy

	Features	Example
Collusion	Explicit collusion, Tacit collusion **Challenges:** • Legal risks. • Incentives to cheat on agreements. • Difficulty in maintaining stability.	OPEC (Organization of Petroleum Exporting Countries).
Price Agreements and Cartels	Price agreements and cartels are formal or informal arrangements among competitors to control prices and output. **Characteristics:** • Joint profit maximisation, Market allocation. • Output restrictions. **Challenges:** • Legal prohibition in many countries. • Instability due to incentives to cheat. • Detection and enforcement by authorities.	1. OPEC (Organization of the Petroleum Exporting Countries): One of the most well-known cartels, OPEC coordinates petroleum policies among its member countries to secure stable oil prices in global markets. 2. De Beers diamond cartel: For much of the 20th century, De Beers controlled a majority of the global diamond market, allowing them to manipulate supply and maintain high prices.
Price Leadership	Price leadership is a form of implicit coordination where one firm, typically the largest or most efficient, sets prices that others follow.	• **Historical:** U.S. Steel in the early 20th century. • **Modern:** Amazon's influence on e-commerce pricing.

	Features	Example
Non-Collusive behaviour	Non-collusive behaviour involves independent decision-making by firms, often leading to more competitive outcomes. **Characteristics:** • Firms act in their own self-interest. • May still result in prices above competitive levels due to mutual recognition of interdependence.	• Competitive pricing in retail gasoline markets. • Product innovation races in tech industries.
Price wars	Price wars occur when firms repeatedly undercut each other's prices, often resulting in prices below cost in the short term. **Causes:** • Excess capacity. • Attempt to gain market share. • Breakdown of collusive agreements. **Consequences:** • Short-term benefits for consumers. • Potential exit of firms from the market. • Long-term reduction in competition.	**Example:** • Airline industry price wars in deregulated markets.

	Features	Example
Differentiation	Product differentiation involves distinguishing a product from its competitors to make it more attractive to a particular target market. **Types:** • Horizontal differentiation (different features). • Vertical differentiation (quality differences). **Strategies:** -Branding, Quality, Design, Customer service, Innovation. **Benefits:** • Reduced price competition. • Customer loyalty. • Higher profit margins.	**Examples:** • Apple's ecosystem in the tech industry • Coca-Cola vs. Pepsi in soft drinks
Customer Loyalty	Customer loyalty refers to a consumer's commitment to repurchase or continue using a company's goods or services. **Factors influencing loyalty:** - Brand image, Product quality, Customer service, Switching costs, Loyalty programs. **Benefits for firms:** - Stable demand, Higher profit margins, Word-of-mouth marketing. **Challenges:** • Costs of maintaining loyalty programs • Changing consumer preferences	**Examples** • Airline frequent flyer programs • Amazon Prime membership

4.3.2 Government Intervention

When there is market failure or collusion, the government often steps in and implements policies that will protect the consumer. One way of doing this is my creating regulatory boards that will be independent organisations that are tasked with the roles of overseeing specific industries and or economic activities with the main aim of making sure there is competition.

Examples include:

- Federal Trade Commission (FTC) in the US
- European Commission's Directorate-General for Competition
- Office of Gas and Electricity Markets (Ofgem) in the UK
- Securities and Exchange Commission (SEC) for financial markets

Regulators aim to protect a diverse range of key stakeholders, including:

- Consumers.
- Employees.
- Investors.
- Small businesses and potential market entrants.
- The environment and local communities.
- The general public.

Regulators perform a variety of essential functions to maintain fair and efficient markets while protecting various stakeholders. These functions include ensuring fair competition by preventing monopolies and anti-competitive practices, protecting consumers through safety standards and fraud prevention, regulating prices in certain sectors, mandating information disclosure, maintaining market stability, and enforcing environmental protections. To achieve these goals, regulators employ tools such as rulemaking, licensing, monitoring, enforcement, and education. However, they face significant challenges, including regulatory capture, information asymmetry, adapting to technological changes, balancing competing interests, and addressing cross-border issues. These diverse responsibilities and challenges underscore the complex role regulators play in modern economies and societies.

Examples of Regulation

Financial Crisis of 2008	Data Protection and Privacy	Environmental Regulation
• Role of regulators in preventing and responding to systemic financial risks • Subsequent regulatory changes (e.g., Dodd-Frank Act in the US)	• Implementation of GDPR in the EU • Ongoing debates about regulating big tech companies	• Evolution of emissions standards for automobiles • Implementation of carbon pricing schemes

Unit B Key Terms

Aggregate demand B2
Aggregate Supply B2
Balance of payments B1
Boom and Bust B1
Collusion B6
Contractionary Fiscal Policy B4
Deficit B1
Differentiation B6
Expansionary Fiscal Policy B4
Fiscal Deficit B4
Fiscal Surplus B4
GDP B1
Inflation B1
Injections B2
Interest rates B3
Intermediaries B2
Market Imperfection B6
Monopoly B6
Oligopoly B6
Perfect Competition B6
Quantitative Easing B3
Recession B1
Regulation B3
Regulations against market imperfections B6

Supply and Demand B2
Surplus B1
The circular flow B2
Unemployment B1
Withdrawals B2

Summary of Unit B and key learning outcomes

Learning Outcomes	Summary
Government objectives	In this section we discussed key economic indicators and concepts used to measure a nation's financial health and performance. We explored GDP as a primary metric, along with other crucial factors like balance of payments, inflation rates, and unemployment levels. The significance of budget deficits and surpluses was examined. We delved into economic cycles, including phases of recession, inflation, and the boom-bust pattern. Understanding these elements provides insight into macro-objectives and helps policymakers and analysts assess and respond to economic conditions effectively. The government's role in managing these economic variables through fiscal and monetary policies was highlighted as crucial for maintaining stability and promoting growth.
Demand and supply in the economy: Supply	We explored the role of supply in shaping the economy, particularly, we looked at the difference changes to supply and how these can shape the economy. Changes to supply include; **Movement along the curve:** Changes in quantity supplied due to price changes. **Shift of the curve:** Changes in supply due to factors other than price **Rightward Shift (Increase in Supply):** Occurs when producers can supply more at every price level. Causes include lower input costs, technological advances, more sellers, or favourable government policies. **Leftward Shift (Decrease in Supply):** Occurs when producers supply less at every price level. Causes include higher input costs, technological setbacks, fewer sellers, or restrictive government policies.

Learning Outcomes	Summary
Demand and supply in the economy: Demand	**Movement along the curve:** Changes in quantity demanded due to price changes. **Shift of the curve:** Changes in demand due to factors other than price. **Rightward Shift (Increase in Demand):** Occurs when consumers are willing to buy more at every price level. Causes include higher income, changes in preferences, increase in population, expectations of future price increases, or complementary goods becoming cheaper. **Leftward Shift (Decrease in Demand):** Occurs when consumers are willing to buy less at every price level. Causes include lower income, changes in preferences, decrease in population, expectations of future price decreases, or substitute goods becoming cheaper.
Circular flow of income	The circular flow of income model illustrates economic activity, featuring injections and withdrawals. It demonstrates how money circulates through various sectors, with intermediaries facilitating transactions between households and firms.
Monetary policy	Monetary policy utilises key instruments such as interest rate adjustments, quantitative easing, and financial regulation. Central banks employ these tools to manage money supply, influence economic growth, control inflation, and maintain overall financial stability.
Fiscal policy	Fiscal policy encompasses government strategies for managing spending and taxation. It includes concepts such as fiscal surplus, deficit, expansionary measures, and discretionary policies. These tools are employed to influence economic conditions, stimulate growth, control inflation, and achieve various macroeconomic objectives. Policymakers use fiscal policy in conjunction with monetary policy to steer the economy.
Market structures	Market structures range from perfect competition to monopolies and oligopolies. Differentiation, imperfections, cartels, and collusion significantly impact competition levels. Regulations aim to address these imperfections, promoting fair market practices. Each structure uniquely influences pricing, output, and consumer welfare, shaping overall economic dynamics and efficiency. Understanding these structures is crucial for analysing market behaviour and formulating effective economic policies.

Unit B Quiz questions

1. In the basic circular flow of income model without any withdrawals or injections, which of the following statements is true?

   A) Households save a portion of their income, which reduces firm revenue.

   B) All household income is spent on goods and services, and all firm revenue is paid out as income to households.

   C) The government collects taxes, which are then used for public spending.

   D) Firms invest in capital goods, increasing the total income in the economy.

2. Which of the following is considered a withdrawal (leakage) from the circular flow of income?

   A) Investment by firms in new machinery.

   B) Government spending on public infrastructure.

   C) Household savings deposited in a bank.

   D) Exports of goods to foreign countries.

3. If an economy experiences an increase in government spending (G), which of the following is most likely to happen in the circular flow of income, assuming no other changes?

   A) The total level of income in the economy will decrease.

   B) Withdrawals will increase, reducing firm revenue.

   C) Injections will increase, potentially boosting firm revenue and household income.

   D) The number of imports (M) will automatically decrease.

4. Which one of the following would normally cause a rightward shift in the demand curve for a product?

   A) A fall in the price of a substitute product.

   B) A reduction in direct taxation on incomes.

   C) A reduction in price of the product.

   D) An increase in the price of a complementary product.

5. Which of the following sequences correctly represents the typical order of phases in an economic cycle?

A) Recession, Trough, Recovery, Peak

B) Trough, Recovery, Peak, Recession

C) Peak, Recovery, Trough, Recession

D) Recovery, Peak, Recession, Trough

6. Which of the following characteristics are typically associated with the Recovery (Expansion) phase of the economic cycle? Select all that apply.

A) Increasing Gross Domestic Product (GDP)

B) Rising unemployment rates

C) Expansion of business investments

D) Decreasing interest rates

E) Growing consumer confidence

F) Falling stock market indices

7. Which of the following scenarios would cause a shift in the demand curve rather than a movement along the demand curve? Select all that apply.

A) An increase in the price of the good

B) A rise in consumers' income levels

C) A decrease in the price of a complementary good

D) The introduction of a new, more efficient production technology

E) A change in consumer preferences towards the good

F) An expectation of future price increases for the good

G) A decrease in the number of sellers in the market

8. Which of the following scenarios would cause a shift to the right in either the supply or demand curve? Select all that apply.

A) An increase in input costs for producers

B) A successful advertising campaign increases desire for the product

C) Technological advancements reduce production costs

D) A decrease in the number of consumers in the market

E) Government subsidies are provided to producers

F) Consumer incomes decrease for a normal good

G) Favourable weather conditions increase crop yields

H) Expectations of future shortages of the good

9. Which of the following statements about collusion and price cartels is CORRECT?

A) Collusion typically leads to lower prices for consumers and increased market competition.

B) Price cartels are illegal in most countries as they are considered anti-competitive.

C) The dairy industry has never experienced any form of price cartel activity.

D) Cartels are usually easy to maintain due to high levels of trust between competing firms.

E) Government regulators encourage the formation of cartels to stabilise markets.

10 Match the following terms with their correct descriptions in the circular flow of income model:

Stakeholder	Objective
Households	A. Where goods and services are bought and sold
Firms	B. Provide factors of production and consume goods and services
Factor Market	C. Collect taxes and provide public goods and services
Product Market	D. Where labour, land, and capital are traded
Government	E. Produce goods and services using factors of production
Financial Institutions	F. Facilitate saving and borrowing in the economy

11. Match the terms in Column A with their corresponding descriptions in Column B. Write the letter of the correct description next to each term in Column A.

Column A	Column B
Perfect Competition	A. A market condition where a single seller controls the entire supply of a good or service.
Market Imperfection	B. A market structure characterised by many buyers and sellers, homogeneous products, perfect information, and no barriers to entry or exit.
Government Intervention	C. The strategy of making a product or service unique to stand out from competitors.
Monopoly	D. Actions taken by the government to address market failures or promote specific economic outcomes.
Oligopoly Differentiation	

Column A	Column B
	E. A market structure with a small number of large firms dominating the industry. F. Any situation that prevents a market from achieving perfect competition, such as barriers to entry, imperfect information, or externalities.

12. Which of the following is an example of a market imperfection?

A) Perfect competition

B) Externalities

C) Complete information

D) Absence of transaction costs

Unit B References and further reading

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Unit C: The investment decision

Learning outcomes

C1. Non DCF investment appraisal

C2. DCF investment appraisal

C3. Further techniques and decisions in investment appraisal

C4. Risk and uncertainty in investment appraisal

Introduction to Unit C

In this unit, we will explore critical investment appraisal techniques used by financial managers to evaluate potential investments. We'll begin by examining non-DCF methods, which offer quick assessments but have limitations. Next, we will explore DCF (Discounted Cash Flow) techniques like Net Present Value (NPV) and Internal Rate of Return (IRR), which form the backbone of modern financial decision-making by considering the time value of money.

We will then investigate advanced appraisal methods, including real options analysis and the integration of non-financial factors, providing a more comprehensive approach to investment evaluation. Finally, we consider the crucial elements of risk and uncertainty in investment appraisal, exploring techniques such as sensitivity analysis, scenario planning, and Monte Carlo simulation.

Throughout this unit, we will emphasise practical applications of these methods in real-world scenarios. By the end, you will have a solid understanding of various investment appraisal techniques and be well-equipped to apply them in financial management situations, enhancing your ability to make informed investment decisions.

C1. Non DCF investment appraisal

These are techniques that consider a decision without discounting cashflows. These methods look at cashflow in today's values and use other techniques to arrive at the decision of accepting or declining a project proposal.

1.1 The Investment decision making process

Figure 17: The investment decision making process

The decision-making process follows a four-step process;

1. **Project proposal-** several projects are considered that fit with the strategy of the business.
2. **Project screening-** At this stage screening begins, unsuitable projects are removed, and only suitable projects are selected.
3. **Financial Analysis-** Once suitable projects are selected, a detailed project appraisal which considers cashflows, risks and returns is conducted.
4. **Project Review-** A post completion audit is conducted at the end to learn from any mistakes.

When making decision in this process we need to consider relevant costs. Only relevant costs would be included in the financial analysis step to make a well-informed decision.

1.1.1 Relevant cashflows

Key Term	**Relevant costs are future incremental costs that are incurred due to the decision being made.**

Relevant costs are future expenses that differ between alternative choices in decision-making. These costs are crucial in managerial accounting, focusing on upcoming cash flows that vary based on the options considered. Relevant costs exclude past expenses and unchanging overheads. They are specific to each decision, helping managers identify the most economically sound path forward by comparing only the costs that truly matter.

Relevant costs can be split into four sections a below;

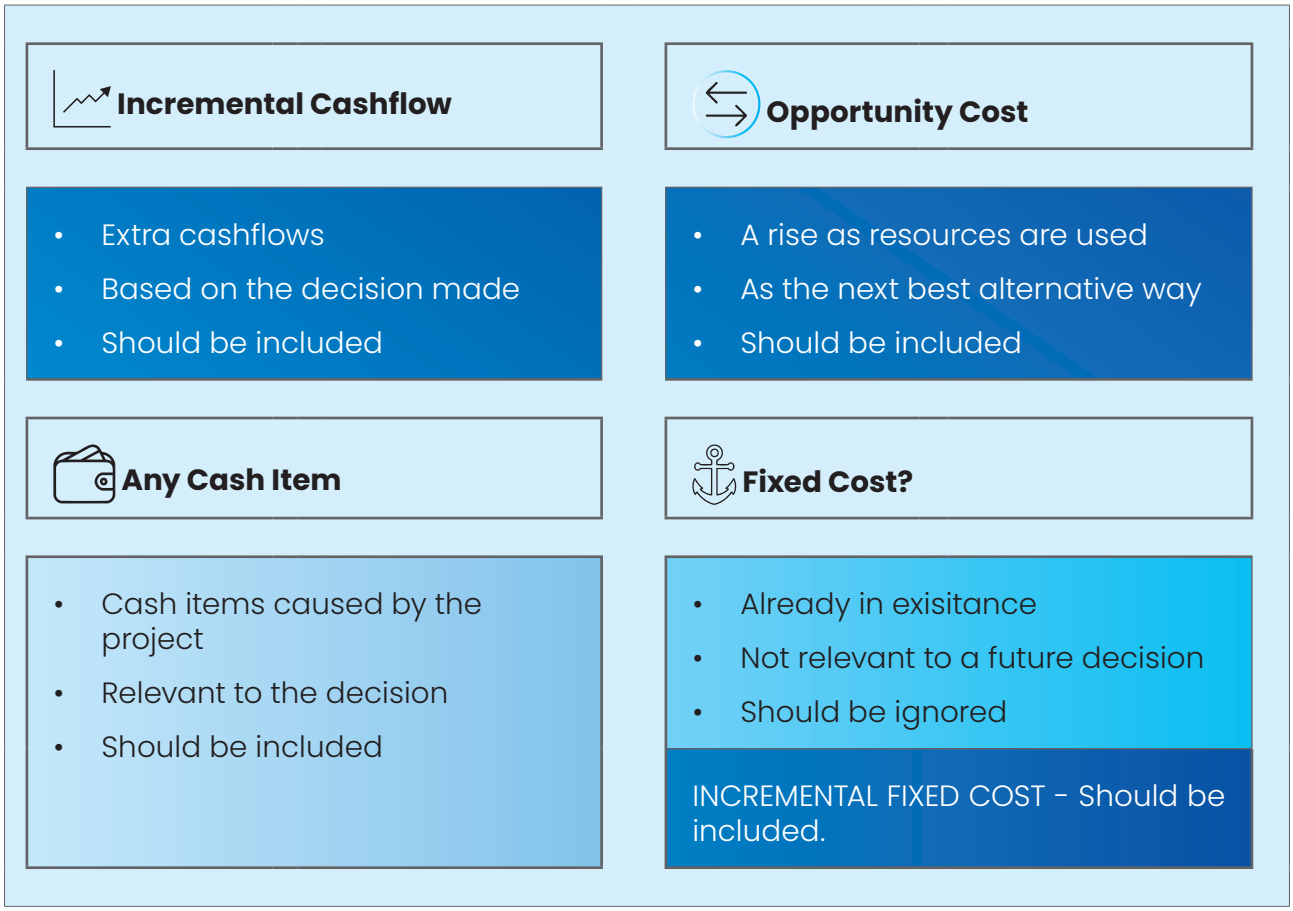

Figure 18: Criteria for selecting relevant costs

The criteria above should be used to make decision for future projects.

Key Term	**Opportunity cost** is cost that is incurred when you choose one option instead of another. In other words, the cost incurred from diverting existing resources from their best use.

Simple Example

A simple example of opportunity costs is when a business chooses between deliveries by air freight instead of shipping. If the business choose air instead of shipping, they gain speed of delivery, but they will miss out on cheaper deliver costs. In this case the opportunity cost is missing out on lower delivery costs. Likewise, if they choose shipping instead of air freight, the opportunity cost is speed and business opportunities lost due to slow deliveries.

1.1.2 Non-relevant cashflows

These are cashflows that would not be relevant to the decision being made. These costs should be excluded from the decision on the new project. The decision criteria is shown below.

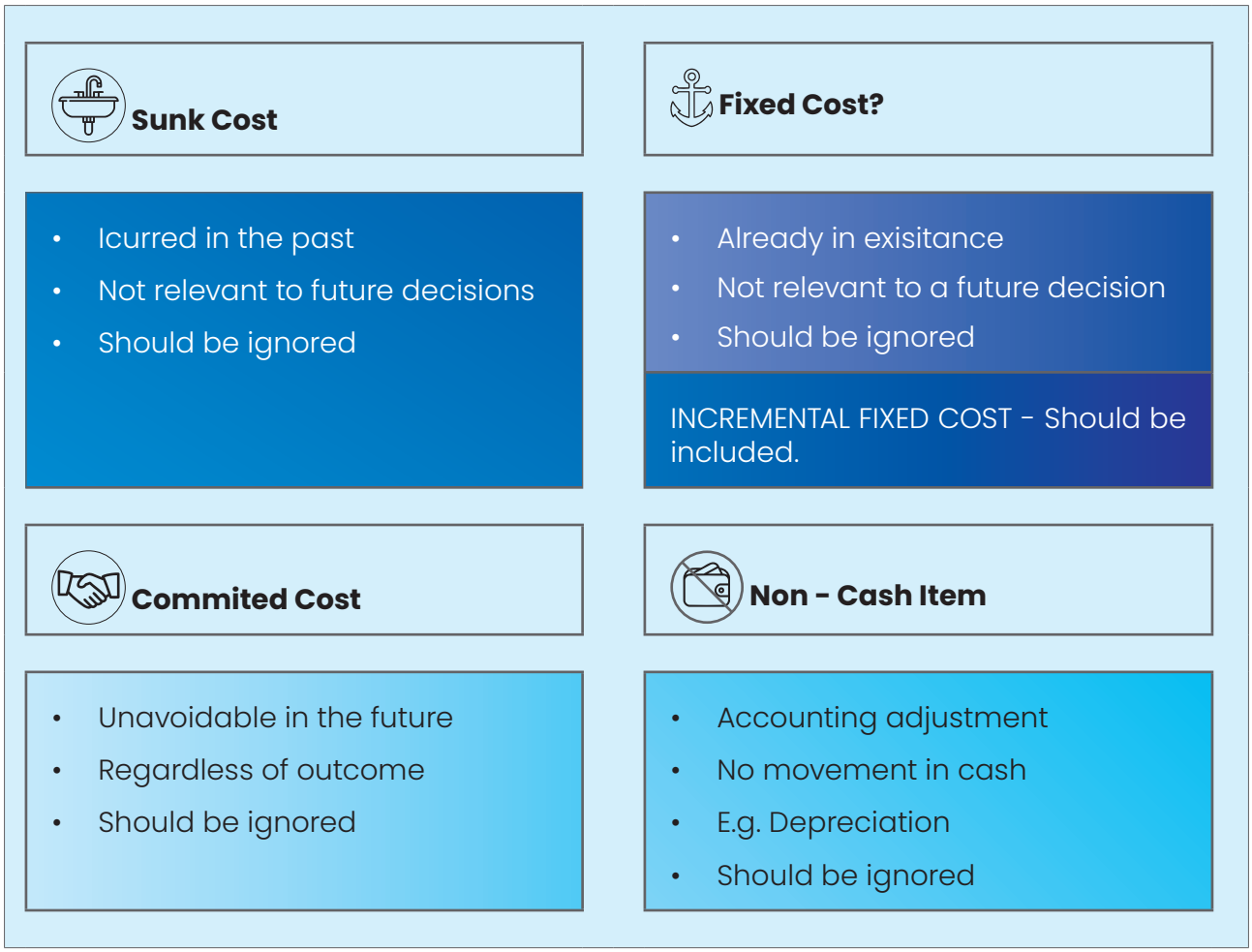

Figure 19: Characteristics of non-relevant costs

We also need to also consider if certain items are already in the business, and they need to be replaced. For example, material for the new project might be similar to material we already use in the business. In this case we need to use the replacement cost or opportunity cost.

1.1.3 Relevant costing Question sample

ABC Manufacturing is considering whether to accept a special order for 1,000 units of a custom product. The following information is available:

The company has already spent FRW500,000 on market research for this product (sunk cost).

- Materials required: FRW800 per unit
- Direct labour: FRW1,000 per unit
- Variable overhead: FRW400 per unit

The special order would require using a machine that could otherwise be rented out for FRW200,000.

- Fixed overhead allocated: FRW500 per unit
- The customer is offering to pay FRW2800 per unit.

Should ABC Manufacturing accept the special order? What is the relevant cost per unit for this decision?

Solution

Step 1: Identify the relevant costs

Let's examine each cost to determine if it's relevant:

FRW500,000 market research: This is a sunk cost, so it's not relevant.

Materials: FRW800 per unit - This is relevant as it's a future cost that will vary with the decision.

Direct labour: FRW1,000 per unit - This is relevant for the same reason as materials.

Variable overhead: FRW400 per unit - This is also relevant as it will change based on production.

Machine opportunity cost: FRW200,000 total - This is relevant as it's an opportunity cost.

Fixed overhead: FRW500 per unit - This is not relevant as it doesn't change with the decision.

Step 2: Calculate the total relevant cost

Material + Labor + Variable Overhead = FRW800 + FRW1000 + FRW400 = FRW2,200 per unit

For 1,000 units: 1,000 × FRW2,200 = FRW2,200,000

Add the opportunity cost: FRW2,200,000 + FRW200,000 = **FRW2,400,000 total relevant cost**

1.2. Simple Investment costing techniques

1.2.1 Payback

This method calculates the length of time taken for a capital project to recover the initial investment of the project in years and months. Alternatively, you can consider this as the length of time to break even.

Recommending a project

When comparing projects on this basis only, you would recommend the project that has the shortest payback period. This is because the longer it takes a business to recover their money the longer, we are without our funds.

1.2.2 Advantages and Disadvantages of Payback

Advantages	Disadvantages
It is easy to calculate and simple to understand.	• It ignores any cashflow returns after the payback period.
It uses cash flows, not accounting profit.	• It ignores the timings of the cash flows. This can be resolved using the discounted payback period.
It is useful in environments with rapidly changing technology.	• It is subjective as it gives no definitive investment signal.
It prioritises projects with a quick return which helps the company grow fast and minimise risk.	• It ignores project profitability.

1.2.3 Illustration of Payback

A company is considering two projects in its project appraisal stage.

Project A

Investment	FRW450,000				
Scrap Value in 5 years	FRW20,000				
Year:	**1**	**2**	**3**	**4**	**5**
Annual Cash flows (FRW000)	200	150	100	100	100

Project B

Investment	FRW100,000				
Scrap Value in 5 years	FRW10,000				
Year:	**1**	**2**	**3**	**4**	**5**
Annual Cash flows (FRW000)	50	40	30	20	20

Assume that the initial investment is at the start of the project and the annual cash flows accrue evenly over the year.

Required

Calculate which project the company should select if the objective is to minimise the payback period.

Solution

Project A takes 3 years 0 months to payback the investment

Year	0	1	2	3	4	5
Annual Cashflows (FRW000)		200	150	100	100	100
Investment Balance	-450	-250	-100	0		

Project B takes 2 years 4 months to payback the investment

Year	0	1	2	3	4	5
Annual Cashflows (FRW000)		50	40	30	20	20
Investment Balance	-100	-50	-10	+20		
Months calculation	10/30 X 12 Months = 4 months					

1.3. Simple Investment costing techniques

1.3.1 Accounting Rate of Return (ARR)

This method differs from the other methods (payback and others discussed below) in that it is based on profits rather than cash-flows. It compares the profit of an investment project to the amount invested in the project and it is expressed as a percentage (%). ARR is sometimes called Return on investment (ROI) or Return on Capital Employed (ROCE).

formulae

Accounting rate of Return =

$$\frac{\textit{Average annual profits}}{\textit{Average investment}} \times 100\% \quad \textbf{or} \quad \frac{\textit{Average annual profits}}{\textit{Initial Capital Investment}} \times 100\%$$

$$\textbf{Average investment} = \frac{\textit{(Initial Outlay + Residual value)}}{2}$$

Decision Criteria: A company will accept a project with an ARR/ROCE above the company's target ROI or benchmark.

1.3.2 Advantages and Disadvantages of ARR

Advantages	Disadvantages
Measures profitability and efficiency.	Doesn't account for risk
Useful for comparing companies across industries.	Can be manipulated through accounting practices.
Helps identify underperforming assets.	May not reflect long-term value creation.
Encourages efficient use of capital.	Ignores intangible assets.
	Can lead to short-term focus.

1.3.3 Illustration of ARR

A company require a new machine which will enable them to expand their product range. To enable them to do this they require a new machine with effect from the start of the year.

Before making a final decision as to whether they will go ahead and expand their product range they have provided the following estimates.

The new machine will cost FRW500,000 payable immediately. There are no other payments or receipts due immediately. This machine will be depreciated over 5 years, and it is expected to have a residual value of FRW10,000 at the end of its life. Sales are estimated to be FRW250,000. Other costs of producing the product are FRW40,000 for the first year and these are expected to increase by FRW40,000 each year for the following 4 years.

Calculate the ARR

Solution

Time	0	1	2	3	4	5
Investment	-500					
Residual Value						10
Sales		250	250	250	250	250
Costs		-10	-10	-10	-10	-10
Other costs		-40	-44	-48	-52	-56
Depreciation		-100	-100	-100	-100	-100
Profit	-500	100	96	92	88	94

$$\text{Average Profit} = \frac{100 + 96 + 92 + 88 + 94}{5 \text{ years}} = 94$$

$$\text{Average Investment} = \frac{500 + 10}{2} = 253$$

$$\text{Accounting rate of return} = \frac{\textit{Average annual profits}}{\textit{Average Investment}} \text{ X } 100\%$$

$$\text{ARR} = \frac{94}{253} \text{ X } 37\%, \text{ this will be compared to the company's target}$$

C2. DCF investment appraisal

In this section, we examine the impact of inflation, which we discussed earlier in Unit B. In the previous section, we highlighted that ARR and Payback share a common weakness: they do not consider the time value of money. Let's explore what this means and its potential impact.

2.1 Time Value of Money and discounting

2.1.1 Time value of money

This technique recognises that FRW1 in a year from now will not buy the same as FRW1 today and allows us to consider the effect of inflation on our project. This concept is known as the time value of money. If a business was to borrow FRW10,000 to buy their assets for a project, how much would they expect to receive from the business? They would want to make more than FRW10,000 plus cover any costs of inflation so they would need to use compounding.

2.1.2 Compounding

This is interest added on an investment that is held for more than one period. Interest in the next period would include the original investment plus the interest earned in the first period.

Key Term

Compounding: the process where the returns or interest earned on an initial investment are reinvested, allowing those returns to generate their own earnings over time. In other words, **it's earning returns on your returns.**

Example

A business deposits FRW10,000 in a bank for 7 years and it earns 8% interest every year.

How much is this investment worth at the end of Year 7?

Solution

Year	Opening balance	Interest	Closing balance
1	10,000	800	10,800
2	10,800	864	11,664
3	11,664	933	12,597
4	12,597	1,008	13,605
5	13,605	1,088	14,693
6	14,693	1,175	15,869
7	15,869	1,269	17,138

From the calculation above we notice that the initial FRW10,000 gains FRW800 interest and this is added to the initial balance to make it FRW10,800. In the second year the new balance of FRW10,800 will gain 8% interest of FRW864. This is compounding.

To make it easier to we can use a formula to calculate this value in one calculation.

 **formulae**	**Future Value (FV) = Present Value (PV) $(1 + r)^t$**
	Where t=time, r= interest rate and PV is the amount today and FV the amount in the future

Applying this formula to the example above we get;

PV = FRW10,000, r= 8% and t= 7 years. So FV = FRW10,000= FRW17,138.

2.1.3 Discounting

The concept of discounting comes from compounding. If we consider the business above trying to estimate how much FRW17,138 would be today if interest rates are around 8%, they would need to do the reverse of what we did when compounding. In this case we would have the FV=FRW17,138 and we will be trying to estimate the Present Value (PV). We can use the same formula and re-arrange to make PV the subject of the formula.

formulae	$\text{Present Value} = \frac{\text{Future Value (FV)}}{(1+r)^t}$
	Where t=time, r= interest rate and PV is the amount today and FV the amount in the future

So, the Present Value (PV) of FRW17,138 would be calculated as PV = $\frac{\text{FRW 17,138}}{(1+8\%)^7}$ **= FRW 10,000**

This is discounting, we are estimating how much an amount received in the future would be worth today to get a better understanding of how much this value is in today's terms.

We can multiply FRW17,138 by $\frac{1}{(1+8\%)^7}$ which if represented as a decimal would be equal to 0.583490395, is the discount factor for 8% 7 years.

Key Terms	**Present Value;** The current worth of a future sum of money, given a specified rate of return. **Discount Factor;** The interest rate used to calculate the present value of future cash flows.

2.1.4 Annuities and Perpetuities

We can now use the concepts above to calculate cashflows received in a project. If a company receives cash inflows in a project on an annual basis, if we know the discount rate or the prevailing interest, we can estimate how much all the cashflows would be in today's terms.

For example, if a company were to receive FRW10,000 every year for 5 years at a discount rate of 10%, we could calculate how much all the cashflows would be using discount rates as below;

Year	0 (Today)	1	2	3	4	5
Amount		10,000	10,000	10,000	10,000	10,000
Discount Factor (10%)		0.909	0.826	0,751	0.683	0.621
Present Value	37,908	9,091	8,254	7,513	6,830	6,209

So, the total of **FRW37,908** is an addition of all the discounted cashflows for the 5 years.

Given that the amounts are all the same we could use a quicker way of getting this number is using an **annuity factor**, which summation of all the discount factors from year 1 to 5. In the above example this is 0.909+0.826+0.751+0.683+0.621 = 3.791. Therefore, we could just calculate FRW10,000 x 3.791 to get FRW37,910, which is much quicker.

The FRW10,000 received every year is the annuity.

Key Terms

Annuity: An annuity is a series of equal payments or receipts that occur at regular intervals over a specified period.

Annuity Factor: The annuity factor is a multiplier used to calculate the present or future value of an annuity. It simplifies calculations involving a series of equal payments.

If an annuity is received every year with no end date, then this becomes a **perpetuity**. We would need a different formula to calculate this.

formulae

Discounting a Perpetuity is; $\textbf{\textit{Present Value} = } \frac{\textbf{\textit{Future Value (FV)}}}{\textbf{\textit{r}}}$ **or** $\textbf{\textit{cashflow X }} \frac{\textbf{\textit{1}}}{\textbf{\textit{r}}}$

Where t=time, r= interest rate and PV is the amount today and FV the amount in the future

So, if the company above is set to receive FRW10,000 every year with not end date.

The present value of this would be = $\frac{\textbf{\textit{1}}}{\textbf{\textit{r}}}$ = FRW100,000

Key Terms

A perpetuity is a constant stream of identical cash flows that continues indefinitely, with no end date. It's an annuity that lasts forever.

Delayed Annuities and Perpetuities

In the examples above we have assumed that the cashflows would be received in the first year. If there is a delay in the receipt of the cashflow, for instance if the FRW10,000

perpetuity above starts in year 3, we would need to adjust our calculation. We would still use the same perpetuity formula which would give us FRW100,000. However, this would be FRW100,000 with year 2 being the period before the cash receipts start. In this case this would be the present value if we are looking at it from year 2. Given that we are not in year 2 and we are in year 0, we would need to discount it to year 0 using the discount factor for 10% year 2 as shown below.

Year 0	Year 1	Year 2	Year 3	Year 4	Year 5		
FRW 82,500			FRW 10,000	FRW 10,000	FRW 10,000 -> Received every year with no end		
←		FRW 100,000	←				
Discount again to Year 0, FRW 100,000 x 0.825 (year 2.10% discount factor)			Discount = FRW 10,000/ 10% = FRW 100,000				

2.2 Basic Net Present Value

2.2.1 Calculating Net Present Value (NPV)

The NPV method looks use the concepts above to evaluate a project acceptability by considering all cashflows (cash in and cash out) involved in a project and discounting them to see whether this would help with maximisation of shareholder wealth. This is done by subtracting all cash outflows from cash inflows to check whether this would give a positive value which would mean that the project is worthwhile.

Decision Criteria

formulae	NPV = Discounted Cash Inflows less discounted Cash Outflows
	If NPV > 0: Accept the project If NPV < 0: Reject the project If NPV = 0: Indifferent

Example

Using the example above, if we know that the company above invested FRW37,800 at the start of the project and received a 5-year annuity FRW10,000 per year, we can calculate NPV as below.

Year	0 (Today)	1	2	3	4	5
Amount	-37,800	10,000	10,000	10,000	10,000	10,000
Discount Factor (10%)	0	0.909	0.826	0,751	0.683	0.621
Present Value	37,800	9,091	8,264	7,513	6,830	6,209
Net Value	**108**					

Given that the Net Present Value (NPV) is positive FRW108, we would accept the project. However, this example exposes one of the weaknesses of this method. According to NPV we should go ahead and undertake a 5-year project only to get FRW108. If the discount factor is wrong or changes then the project would fail. This highlights the need for IRR.

2.3. Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) represents the discount rate at which the Net Present Value (NPV) of a project becomes zero. This metric is crucial because it indicates the highest discount rate at which a project remains financially viable. If the actual discount rate exceeds the IRR, the project would result in a negative NPV, indicating a potential loss.

2.3.1 Calculating IRR

To calculate IRR, we need two NPVs and two discount rates so we can use a method called interpolation which is a method used to approximate the IRR by using two NPV calculations with different discount rates, where one NPV is positive and the other is negative.

 **formulae**	$$IRR = a\% + \frac{NPVa}{NPVa - NPVb}(b\% - a\%)$$
	Where, a% is the lower discount rate which gives NPVa, and b% is the higher discount rate which give NPVb
	Decision Criteria; If IRR > required rate of return: **Accept the project** If IRR < required rate of return: **Reject the project**

Example

Continuing with our example, we calculate NPV at 10% to get FRW108. To get a negative NPV we would need to use a rate higher than 10%. If we use 20% this is what we would get;

Year	0 (Today)	1	2	3	4	5
Amount	-37,800	10,000	10,000	10,000	10,000	10,000
Discount Factor (10%)	0	0.833	0.694	0.579	0.482	0.402
Present Value	(37,800)	8.333	6,944	5,787	4,823	4,019
Net Value	**(7,894)**					

We can now use the IRR formula to calculate what the Internal rate of return would be as follows;

$$IRR = 100\% + \frac{FRW\ 108}{FRW\ 108 - FRW\ 7,894}\ (20\% - 10\%)$$

The IRR is 10.11%, this means that this project would breakeven at 10.11%. This company would need to make sure they do not borrow at more than that rate.

2.3.2 NPV vs IRR

There are instances in which these two methods can tell a different story, so it is useful to look at the key differences between them.

Criteria	NPV	IRR
Output	Absolute value.	Percentage (%), this has potential of hiding the size of the project which makes it harder to compare projects.
Scale of investment	Considers the scale of investment.	Ignores the scale of investment.
Ease of understanding Can be harder to interpret.		Often easier for non-finance professionals to understand.
Changing discount rates	Can handle multiple discount rates.	Assumes a single discount rate.

Criteria	NPV	IRR
Multiple projects	Can rank mutually exclusive projects.	May lead to incorrect decisions for mutually exclusive projects.
Non-conventional cash flows: e.g. negative cashflow after year 1	Always gives a single solution	May result in multiple solutions
Reinvestment assumption	NPV: At the cost of capital	At the IRR itself (which can be unrealistic)

IRR has some key weaknesses which makes is more inferior to NPV, these limitations include;

Non-conventional cash flows:

In projects with non-conventional cash flows (where cash flows change sign more than once), IRR can produce multiple solutions or no solution at all. This is because the NPV function can cross the x-axis multiple times, resulting in multiple IRR values.

Example: A project with cash flows of (-FRW1000, +FRW5000, -FRW4200) has two IRR values: 25% and 33.33%.

Reinvestment assumption:

IRR implicitly assumes that interim cash flows can be reinvested at the IRR itself. This assumption is often unrealistic, especially for high IRR projects, as it's unlikely that a company can continually reinvest at such high rates.

Example: If a project has an IRR of 25%, it assumes all positive cash flows can be reinvested at 25%, which may not be feasible in reality.

These limitations led to the development of MIRR (Modified Internal Rate of Return).

2.4. MIRR

MIRR addresses both the non-conventional cash flow problem and the unrealistic reinvestment assumption of traditional IRR.

Definition: MIRR is the rate that equates the future value of positive cash flows (reinvested at the cost of capital) with the present value of negative cash flows (discounted at the financing cost).

Key features of MIRR:

Feature	Explanation
Reinvestment assumption.	MIRR allows for a more realistic reinvestment rate, typically the firm's cost of capital.
Single solution	MIRR always provides a single solution, even for non-conventional cash flows.
Formula Assumptions	$MIRR = \left(\frac{FV\ of\ positive\ cashflows}{PV\ of\ negative\ cashflows}\right)^{\frac{1}{n}}$, Where n is the number of periods
Interpretation	MIRR represents a project's true rate of return, considering both the cost of financing and the return on reinvested cash flows.

By using MIRR, financial managers can overcome the main limitations of traditional IRR, providing a more accurate and realistic measure of a project's profitability.

Example

Let's look at how MIRR could be useful in our example. Suppose the cashflows of the project were now as follows,

Year	0 (today)	1	2	3	4	5
Amount	-27,800	10,000	10,000	-2,000	10,000	10,000

The negative in year 3 would mean that we would have multiple IRRs. We could solve this by calculating MIRR at a finance rate of 8% and discount rate of 10% using the following steps.

Step 1: Separate positive and negative cash flows

Negative cash flows: -FRW27,800 (Year 0), -FRW2,000 (Year 3)

Positive cash flows: FRW10,000 (Years 1, 2, 4, and 5)

Step 2: Calculate the future value of positive cash flows

FV of positive cash flows =

10,000 * (1.10) ^4 + 10,000 * (1.10) ^3 + 10,000 * (1.10) ^1 + 10,000

= 14,641 + 13,310 + 11,000 + 10,000

= FRW48,951

Step 3: Calculate the present value of negative cash flows

PV of negative cash flows =

27,800 + 2,000 / (1.08) ^3

= 27,800 + 1,587.66

= FRW29,387.66

Step 4: Apply the MIRR formula

$$MIRR = \left(\frac{FV\ of\ positive\ cash\ flows}{PV\ of\ negative\ cash\ flows}\right)^{\frac{1}{n}}$$, Where n is the number of periods (5 years in this case)

$$MIRR = \left(\frac{FRW\ 48{,}951}{FRW\ 29{,}387.66}\right)^{\frac{1}{5}} - 1$$

$$= (1.6657)^{\frac{1}{5}} - 1$$

= 1.1074 - 1

= 0.1074 or 10.74%

Therefore, the MIRR for this project is 10.74%.

Interpretation:

The MIRR of 10.74% represents the project's annualised return, assuming that positive cash flows are reinvested at the 10% cost of capital and negative cash flows are financed at 8%. This rate is likely more realistic than a traditional IRR calculation would be for this set of non-conventional cash flows.

2.5. Advanced Net Present Value

So far, we have looked at the basic concept of NPV. Let us now consider the impact of inflation, tax and working capital changes as this closer to reality.

2.5.1 Adjusting for Inflation

As we saw in Unit B, Inflation is the rate at which the general level of prices for goods and services is rising in an economy over time. If we are planning to a project and the inflation rate is around 15% then we would need to include it in our calculation.

Year	0 (today)	1	2	3	4	5
Amount	-37,800	10,000	10,000	-2,000	10,000	10,000
Inflation Rate 15%	1	1,150	1,323	1,521	1,749	2,011
Inflatied cashflows	(37,800)	11,500	13,255	15,209	17,490	20,114
Inflation formula	=(1+15%)^0	=(1+15%)^1	=(1+15%)^2	=(1+15%)^3	=(1+15%)^4	=(1+15%)^5

If we have more than one rate of inflation for our cashflows we would need to apply the individual rates to each cashflow. However, if we have general inflation for all cashflows we have a choice between inflating all cashflows and then adjusting the discount rate with that same rate or we could just calculate everything in real terms.

Adjusting the cost of capital

formulae	***(1 + i) = (1 + r) (1 + h)***
	Where, i= nominal (money) rate of interest, i=general rate of inflation and r=real rate of interest

So, if the inflation rate is 15% as above and we have a cost of capital (real rate) of 10%, we would calculate the nominal (money rate) as (1+i) = (1+10%) (1+15%) which gives a nominal rate of 26.5%.

Key Terms	**Real:** this is used for cashflows, or cost of capital based on **current price levels.** **Nominal:** this is used for cashflows or cost of capital which have been **adjusted for inflation.** **Inflation rate:** A rate based on the retail price index (RPI) or consumer price index (CPI)

2.5.2 Allowing for Tax

We also need to consider the impact of tax on our project cashflows. Tax will affect cashflows in two ways;

1. We need to pay corporation tax on profits.
2. We can claim capital allowances for any expenditure on assets.

Corporation Tax

Corporation tax is usually straightforward as we just need to check the tax rate and whether we pay it in arrears or in the same year.

Capital Allowances (Tax Allowable Depreciation)

Tax allowable depreciation, also known as tax depreciation or capital allowances, is a concept in taxation that allows businesses to deduct the cost of certain capital assets over time. This can be claimed before paying tax, which means this will be a tax saving which would also be a relevant cost to the project.

This can be applied as straight-line depreciation or reducing balance method.

Reducing Balance method

If a company buys an asset for 5 years for FRW20,000 and tax allowable depreciation is available at 25% reducing balance, we would calculate TAD as follows;

Year	**0**	**1**	**2**	**3**	**4**	**5**
WDV b/f		20,000	15,000	11,250	8,438	6,329
TAD		5,000	3,750	2,813	2,110	6,329
TAD calculation		25% of 20,000	25% of 15,000	25% of 11,250	25% of 8,438	balancing allowance
WDV c/f		15,000	11,250	8,438	6,329	

If the asset was sold for FRW5000 then we would need to adjust the balancing allowance as follows;

Year	**5**
WDV b/f	6,329
Disposal value	(5,000)
TAD balancing allowance	**1,328**
WDV c/f	-

If the scrap value is greater than the WDV at the start of the year, there would be no TAD, and the excess would be taxed as a balancing charge since this is an income.

Tax savings on TAD

Once we have our TADs, we can now calculate the tax savings which would need to be recognised as a cashflow to the project. Let's assume a tax rate of 20% for this calculation.

Year	0	1	2	3	4	5
WDV b/f		5,000	3,750	2,813	2,813	2,813
Tax saving		5,000	3,750	703	703	703
Tax saving calculation		20% of 5,000	20% of 3,750	20% of 2,813	20% of 2,813	20% of 2,813

Question approach for TAD calculation

1. Start by calculating the amount of TAD claimed in each year.
2. Calculate the balancing allowance in the final year.
3. Calculate the tax saved and match with the year tax is paid.

2.5.3 Working Capital Changes

Every project will also need some kind of working capital. This would mainly be for short term assets like inventory. From a project point of view, we look at whether there is a cash inflow/outflow due to the introduction or withdrawal of working capital; an increase is a cash outflow, and a decrease is a cash inflow.

Working capital calculation

At the start of the project, we would need to inject some working capital- this is a cash outflow

Every year after that- we calculate to check if working capital has increase or not as follows;

Year	0	1	2	3	4	5	Total
Working capital needs		500	700	1,000	500	-	
Inflow (Outflow)	(500)	(200)	(300)	500	500	-	0
Explana-tion	We invest 500 for year 1 working capital needs	We inject another 200 since we already have 500	We inject another 300 in the business	Only 500 needed in Y4 so we withdraw.	Y5 does not need working capital so we withdraw the last 500	No working capital is left in the project.	If you add up all the inflows and outflow, you should get ZERO.
Inflow (Outflow)	Outflow	Outflow	Outflow	Inflow	Inflow		

2.5.3 Advanced NPV Layout

When we consider all the possible adjustments that we have discussed in this section the layout for an NPV calculation would then look like this;

Year	Adjustments	0	1	2	3	4	5	6
Investment		(x)						
Scrap value								
Sales	x inflation rate		x	x	x	x	x	
Costs	x inflation rate		(x)	(x)	(x)	(x)	(x)	
Operating Cashflow			x	x	x	x	x	(x)
Taxation	delay by a year			(x)	(x)	(x)	(x)	(x)
Tax benefits of TAD	positive values			x	x	x	x	(x)
Working capital changes	inflow/ (Outflow)	(x)	(x)	(x)	x	(x)	x	(x)
Net Cashflows	add all cashflows	(x)	x	x	x	x	x	x
Discount Factor (say 10%)	post tax cost of capital	1	0.909	0.826	0.751	0.683	0.621	0.564
Present value	multiply cashflow with discount rate	(x)	x	x	x	x	x	x
Net Present Value		x						

2.5.4 Advanced NPV Example

Baliwa Ltd is evaluating the purchase of a new bottling machine to produce a new premium soft drink product line. Due to rapidly changing consumer preferences and technological advancements, the product is expected to have a relatively short life cycle. The machine is expected to cost FRW 850,000,000.

Production and sales are forecast as follows:

Year	1	2	3	4
Production and sales (units/ year)	2,000	58,000	82,000	39,000

The selling price (in current price terms) will be FRW 18,000 per unit, while the variable cost (in current price terms) will be FRW 11,000 per unit.

Selling price inflation is expected to be 6% per year, and variable cost inflation is expected to be 7% per year.

No increase in existing fixed costs is expected since Baliwa has spare capacity in both space and labour terms at its Gisenyi plant.

The production and sale of the new product line will require increased investment in working capital. Analysis of historical levels of working capital within Baliwa indicates that at the start of each year, investment in working capital will need to be 8% of sales revenue for that year.

Baliwa pays corporate income tax at 30% per year in the year in which the taxable profit occurs. Liability to tax is reduced by capital allowances (tax-allowable depreciation) on machinery, which Baliwa can claim on a straight-line basis over the four-year life of the proposed investment. The new machine is expected to have no scrap value at the end of the four-year period.

Baliwa has a real cost of capital of 11.2%, and the general rate of inflation is expected to be 4%.

Required:

Calculate the net present value of the proposed investment in the new product line.

Advise on the acceptability of the proposed investment and discuss any limitations in your analysis.

Solution

Calculation of NPV

Year	***0***	***1***	***2***	***3***	***4***
	FRW'000	**FRW'000**	**FRW'000**	**FRW'000**	**FRW'000**
Sales revenue (W1)		806,400	1,297,960	1,953,960	987,480
Variable costs (W2)		(497,420)	(847,660)	(1,284,740)	(687,180)
Contribution		308,980	450,300	669,220	300,300
Taxation @ 30%		(92,694)	(135,090)	(200,766)	(90,090)
Capital expenditure	(850,000)				
Working capital (W3)	(64,512)	(38,072)	(52,480)	27,880	127,184
Tax benefit of tax depreciation (W4)		63,750	63,750	63,750	63,750
Net cash flow	(914,512)	241,964	326,480	560,084	401,144
Discount factor (W5)	1.000	0.885	0.783	0.693	0.613
Present value	(914,512)	214,138	255,634	388,138	245,901
NPV	189,299				

Workings

W1. Sales Revenue

Year	***1***	***2***	***3***	***4***
Selling price (×1.06)	FRW 19,200	FRW 20,352	FRW 21,573	FRW 22,867
Sales volume in units	42,000	58,000	82,000	39,000
Sales revenue (FRW'000)	806,400	1,297,960	1,953,960	987,480

W2. Variable costs

Year	***1***	***2***	***3***	***4***
Variable cost (×1.07)	FRW 11,843	FRW 12,672	FRW 13,559	FRW 14,508
Sales volume in units	42,000	58,000	82,000	39,000
Variable costs (FRW'000)	497,420	847,660	1,284,740	687,180

W3. Working capital

Year	*0*	*1*	*2*	*3*	*4*
Sales revenue (FRW'000)	-	806,400	1,297,960	1,953,960	987,480
Working capital requirement @8%	64,512	103,837	156,317	78,998	0
Incremental working capital cash flow	(64,512)	(38,072)	(52,480)	27,880	127,184

W4. Tax benefit of tax depreciation

Item	Calculation	Amount
Annual depreciation	FRW 850,000,000 ÷ 4	FRW 212,500,000
Tax benefit @30%	FRW 212,500,000 × 30%	FRW 63,750,000

W5. Cost of capital

Calculation	Step	Result
Real cost of capital	Given	11.2%
General inflation	Given	4.0%
Nominal cost of capital	(1 + 0.112) × (1.04) - 1	15.6%
Year 1 discount factor	1 ÷ (1.156)¹	0.885
Year 2 discount factor	1 ÷ (1.156)²	0.783
Year 3 discount factor	1 ÷ (1.156)³	0.693
Year 4 discount factor	1 ÷ (1.156)⁴	0.613

Limitations of the evaluation:

Forecast sales volumes have been used and the accuracy of the results is heavily dependent on these forecasts. The product has a short life cycle which makes forecast sales volumes particularly unpredictable in the Rwandan market where consumer preferences are rapidly evolving.

The analysis has used predicted inflation rates for sales price (6%) and variable costs (7%) which do not change over the four-year period. This is particularly uncertain in Rwanda's emerging market context where inflation rates can be volatile and influenced by various external factors.

Fixed costs have not been included in the investment appraisal based on the assumption of spare capacity at the Gisenyi plant. This assumption may need to be revisited, especially as production in Year 3 is nearly double that of Year 1.

The analysis assumes stable tax rates and capital allowance policies over the project period. Any changes in Rwanda's tax legislation could impact the project's viability.

Currency risk has not been considered. If any components need to be imported, exchange rate fluctuations could significantly impact the variable costs.

The analysis assumes the company can achieve the projected selling prices in a market that may be price-sensitive. Competition from imported products or local alternatives could force price adjustments.

C3. Further techniques and decisions in investment appraisal

3.1 Real Options

3.1.1 Types of Options

NPV is widely used by most financial managers and finance professionals, but it has its weaknesses which we explored in Section 2.3. One of the weaknesses is that it does not consider other aspects outside the scope of the project, and this could lead to opportunities being missed. One method that takes into consideration options available to the business is Real options.

Real options represent the right, but not the obligation, to take certain business actions in the future. These actions might include:

- Expanding a project
- Delaying investment
- Abandoning a project
- Changing the scale of operations

The main aspects of real options include;

Flexibility: They provide management with flexibility in decision-making.

Uncertainty: They're particularly valuable in uncertain environments.

Irreversible investments: Often applied to large, irreversible capital investments.

Value creation: Can add significant value to projects by allowing companies to adapt to changing conditions.

3.1.2 Evaluating Options

Real options analysis helps managers quantify the value of these future opportunities and make more informed decisions about investments and strategy. We can use the Black Scholes option pricing method to calculate the values of a call option or a put option. The figure below shows we can decide whether an option is a **call option** or a **put option.** The calculation of real options is outside the scope of this syllabus. However, it is important to note that the value of a real option can be added to the traditional NPV to give a more accurate assessment of the value of the project which includes the options.

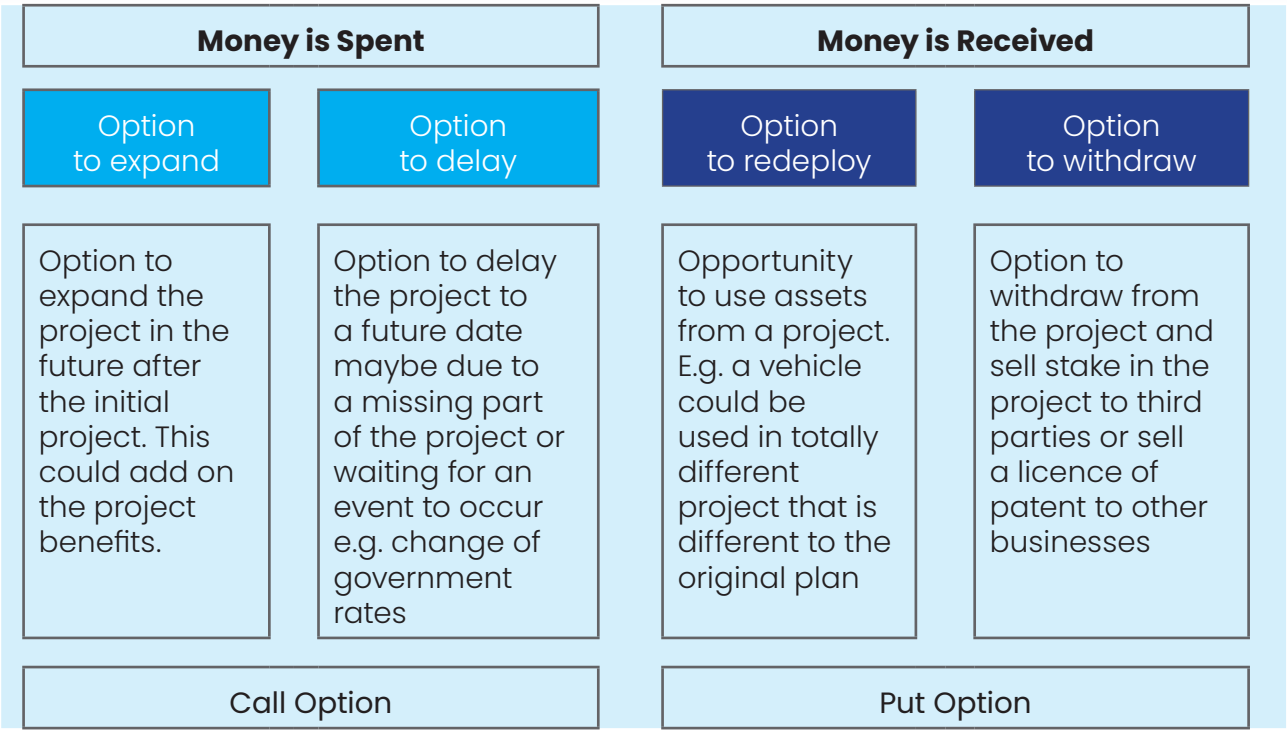

Figure 20: Criteria for classifying real options

3.1.3 Real life Examples

Option to Expand:

A technology startup launches a new app with a basic set of features. They design their infrastructure to easily accommodate additional features if the app proves successful. This is an expansion option.

Example: Netflix started as a DVD rental service but built its business model with the option to expand into streaming when technology improved. This expansion option became extremely valuable as internet speeds increased. (Kogut & Kulatilaka,2001).

Option to Delay Investment:

An oil company owns drilling rights in a certain area but can wait to start drilling until oil prices rise to a more favourable level.

Example: In 2015, many shale oil producers in the US delayed drilling new wells when oil prices dropped, waiting for more favourable market conditions before investing. (Paddock, Siegel & Smith, 1988)

Option to Abandon:

A pharmaceutical company is developing a new drug. At each stage of clinical trials, they have the option to abandon the project if results are unfavourable.

Example: Pfizer abandoned development of its cholesterol drug bococizumab in late-stage clinical trials in 2016 when data showed it wasn't as effective as hoped, saving further investment in a potentially unprofitable product. (Hartmann & Hassan, 2006).

Option to Change Scale:

A manufacturer builds a factory with the ability to easily increase or decrease production based on demand.

Example: Toyota's flexible manufacturing systems allow them to quickly adjust production volumes or even switch between different car models on the same production line, depending on market demand. (Monden, 2011)

3.2. Forecasting and Trend Analysis

3.2.1 Use of Spreadsheets

Spreadsheet software plays a crucial role in assisting businesses with forecasting future cash flows. Here's an explanation of how such software is used, including various techniques and concepts:

Factor	Description
Trend Analysis	Visualise historical data to identify patterns and project future cash flows.
Linear Equations	Use regression models to predict future values based on historical trends.
Big Data and Computing Power	Handle large datasets and perform complex calculations quickly.
Time Series Analysis	Implement techniques like moving averages and ARIMA (Autoregressive Integrated Moving Average) for time-dependent forecasting.
Scenario Analysis	Model multiple outcomes based on different assumptions or potential events.
Sensitivity Analysis	Adjust key variables to understand their impact on projected cash flows.
Monte Carlo Simulation	Generate thousands of possible scenarios for probabilistic forecasting.
Data Integration	Incorporate real-time data from various sources for more accurate forecasts.
Collaborative Features	Allow multiple users to work on forecasts simultaneously.
Automated Reporting	Generate real-time reports and dashboards for up-to-date projections.

By leveraging these capabilities, businesses can create more accurate, flexible, and comprehensive cash flow forecasts. The power of spreadsheet software lies in its ability to handle complex calculations, visualise data, and adapt to various forecasting methodologies, all while remaining accessible to users with varying levels of technical expertise.

3.2.2 Use if AI in Forecasting and Trend Analysis

When combined with traditional spreadsheet-based methods, AI can significantly enhance the accuracy, speed, and depth of cash flow forecasting and trend analysis. However, it's important to note that human oversight and domain expertise remain crucial in interpreting and applying AI-generated insights.

The information below expands on the spreadsheet-based methods we discussed earlier, showing how AI can take these processes to the next level.

Some key points to highlight:

- AI excels at recognising complex patterns that might be invisible to human analysts or traditional statistical methods.
- Machine learning models can adapt and improve over time, potentially increasing forecast accuracy as more data becomes available.
- AI can process vast amounts of data, including unstructured information like news articles or social media posts, to provide a more comprehensive view of factors affecting cash flow.
- Advanced AI techniques like deep learning can capture long-term dependencies in time series data, which is particularly useful for cash flow forecasting.
- AI can automate many aspects of the forecasting process, from feature selection to report generation, potentially saving time and reducing human error.
- The ability of AI to generate and analyse multiple scenarios quickly can provide a more robust understanding of potential future outcomes.

3.3 Capital Rationing

Capital rationing refers to the process of allocating limited financial resources among multiple investment opportunities or projects within an organization. This occurs when a company insufficient capital to invest in all available positive NPV projects.

In capital rationing, firms must carefully evaluate and prioritise investment options that will maximise overall returns given their budget constraints. This often involves using financial metrics like Net Present Value (NPV), Internal Rate of Return (IRR), or payback period to rank and select the most promising projects.

There are two main types of capital rationing:

Hard capital rationing	Soft capital rationing:
This occurs due to external constraints, such as difficulty in raising funds from the market or lender-imposed restrictions.	This is a self-imposed limit by management, often to maintain financial prudence or control growth.

Capital rationing is an important concept in financial management and investment decision-making, as it helps companies make efficient use of their limited financial resources. The method used to decide which projects to undertake will depend on whether the projects are divisible or indivisible.

3.3.1 Divisible Projects

If projects are divisible, we can use the profitability index to rank the projects and choose the ones with this highest profitability index first.

 formulae	***Profitability Index =*** $\frac{\textit{Present value of cash in flows}}{\textit{Initial cash out flows}}$
	Any project with a PI of 1 and above shows that the project has a positive NPV. The higher the PI the higher the return delivered by the project.

Example

Let's consider a company with a capital budget of FRW500,000 and four divisible investment projects.

Project	Initial Investment (FRW000)	Present Value of Future Cashflows (FRW000)
A	300	450
B	200	280
C	250	325
D	150	220

Calculate the Profitability Index for each project and rank the projects based on their PI

$$\textit{Profitability Index (PI)} = \frac{\textit{Present Value of Finance Cash Flows}}{\textit{Initial Investment}}$$

	Initial Investment	PVFCF	Prof Index	Rank
Project A	300	450	1.5	1
Project B	200	280	1.4	3
Project C	250	325	1.3	4
Project D	150	220	1.5	2

Allocate funds to capital projects starting with the one ranked 1st

	Rank	Initial Investment	Budget	Remaining budget	% completed	NPV
Project A	1	300	500	200	100%	150
Project D	3	150	200	50	100%	80
Project B	4	200	50	0	25%	18.75
Project C	2	250	0	0	0	0

Since the project are divisible, we can also complete 25% of project B since on FRW50,000 is left after completing project A and B.

3.2.2 Indivisible Projects

If projects are indivisible, we use a trial-and-error method and use a combination that has the highest NPV return. We can try a number of combinations and use the one with the highest return.

	Initial Investment	NPV		Remaining budget	Budget used	Total NPV
Project A	300	150		Project A and B	500	230
Project B	200	80	→	Project B and C	450	155
Project C	250	75		Project C and D	400	145
Project D	150	75		Project B and D	350	150

Based on the calculation the best combination would be project A and B which gives a total NPV of FRW230,000.

3.3.3 Limitations of Capital Rationing

Both methods are based on several assumptions, and these can be viewed as limitations. The main limitations with these methods include:

- Projects are viewed as independent projects, in reality some of the projects could be linked and follow on projects could be explore after the first one (see Real options section).
- Projects are viewed as single period projects only.
- Multiples of a single project are not considered. For example, in the above Project C could have been done twice and it would use the FRW500,000 that was available. However, this is not allowed by this method.
- The methods do not consider delaying some projects and using cashflows from these projects in other projects like in real options.
- They do not consider other financing options like lease or buy options (discussed below).

3.4 Lease or Buy Options

Leasing can be a viable method of financing a project especially in periods of limited finances or capital rationing. Leasing has a number of advantages that include free servicing, insurance from the provider of the lease. This could save a significant amount that would have been an outflow to the project. Other benefits include avoiding getting loans from banks that could come with some restrictions and loan covenants. However, leasing can come with some extra costs which would not there if you bought an asset outright. Therefore, it is important to consider each case individually considering all cashflows involved in both options (leasing or buying) and choosing the best option.

 **Key Terms**	**Lessee:** a lessee is the party that **makes** lease payments and **receives** the asset. **Lessor:** a lessor is the party that **receives** lease payments and **provides** the asset.

3.4.1 Calculating the cost of Leasing

When calculating the costs and benefits of leasing we need to consider:

Costs: we need to consider the cost of lease payments, opportunity costs of not buying the asset which include lost tax allowable depreciation and benefits of a scrap value.

Benefits: these include saving the upfront cost of buying an asset outright, maintenance costs, servicing and other costs depending on the lease contract.

Discounting: We then use the post tax cost of debt to discount the cashflows.

Once we know the cost of leasing we can compare to other options (buying cash or using a loan).

3.4.2 Evaluating the best option

Let's use an example to demonstrate how to calculate and evaluate a lease or buy decision.

Example

A company has just finished the project selection stage and have chosen a project that needs FRW100,000 to buy a machine. The machine has a four-year life with a scrap value of FRW15,000 and 25% writing down allowances.

The company has the option to finance the asset using a bank loan that has a pre-tax cost of debt of 8.75% or paying four equal lease payments of FRW30,000 in arrears. Tax is payable at 20% in the same year profits are made.

Evaluate what the best option is for the company.

Solution

Post tax cost of debt = 8.75% x (1-20%) = 7%

Tax allowable depreciation (TAD) = FRW100,000/4 =FRW25,000 per year

Tax saved on TAD= FRW25,000 x 20% =FRW5,000

Tax saved on lease payments = FRW30,000 x 20% = FRW6,000

Evaluation

Leasing				**Buying**		
	Year 0	**Years 1-4**			**Year 0**	**Years 1-4**
Lease		(30,000)		Outlay	(100,000)	
Tax saved		6,000		Tax saved on TAD		5,000
Net Cashflows		(24,000)		Total	(100,000)	5,000
Annual Factor 7% 4 years		3,387		DF/ AF 7%	1	3,387
PV		(81,288)		PV	(100,000)	16,935
NPV	(81,288)			NPV	(83,065)	

Based on the calculation above, it costs FRW1,777 more to buy the machine outright. The best option is to lease the machine.

3.4.3 Benefits to the Lessor

We would also need to consider benefits to the lessor;

Returns from loan: The lessor will increase income due to receipts from lease payments which include an interest element compared to a customer who buys outright.

Increase in sales: Sales will increase due to having more options for customers.

Extras: Opportunity to include other services in the lease packages and charge it as part of the lease.

3.5 Asset replacement

Another consideration we would need to make is how often we need to replace our assets especially since some lease agreements come with an option to upgrade the asset for a new one for close to the same payments as the original one. The key considerations here would be the benefits of a shorter replacement cycle vs a longer replacement cycle.

Shorter replacement cycle	**Longer replacement cycle**
Tends to come with lower operating costs since the asset is new and has less breakdowns.	Operating costs increase with time due to age and technological advancements of newer products.
Higher scrap value especially if being used in a swap deal.	Lower scrap value due to use. May also be obsolete.
Increased capital expenditure due to changes.	Lower capital spent on replacing assets

3.5.1 Equivalent Annual Cost

If we consider both cycles, we notice that they both have costs and benefits which depend on the situation. The ideal replacement cycle would be one that minimises the costs while maximising the benefits. This the Equivalent Annual Cost (EAC).

 **formulae**	$$EAC = \frac{\textit{NPV of cost over replacement cycle}}{\textit{Annuity factor for the life of the asset}}$$
	This is expressed as the present value of the of the costs of an asset replacement cycle as as a cost per year.

Revenues are not a relevant cashflow for this decision since these would be more or less the same for all the options. This is a limitation, since in reality sales and opportunities will decrease due to old age of the asset and technological advancements.

Example

A company is considering investing in an asset with a four year cycle. They have the following estimates of the operating costs and scrap value of the asset;

Year	0 (Today)	1	2	3	4
Purchase cost	30,000				
Operating costs		(5,000)	(7,500)	(10,000)	(15,000)
Scrap value		15,000	10,000	7,500	5,000

The company sues a cost of capital of 10%.

Identify how frequently the asset should be replaced.

Solution

Step 1: PV of replacement cycle										
Year	**Discount Factor**		**1**	**PV @ 10%**	**2**	**PV @ 10%**	**3**	**PV @ 10%**	**1**	**PV @ 10%**
0	1	Purchase cost	(30,000)	(30,000)	(30,000)	(30,000)	(30,000)	(30,000)	(30,000)	(30,000)
1	0.909	Operating costs	(5,000)	(4,545)	(5,000)	(4,545)	(5,000)	(4,545)	(5,000)	(4,545)
1	0.909	Scrap value	15,000	13,636	-	-		-		
2	0.826	-			(7,500)	(6,198)	(7,500)	(6,198)	(7,500)	(6,198)
2	0.826	Scrap value			10,000	8,264	-		-	
3	0.751	Operating costs					(10,000)	(7,513)	(10,000)	(7,513)
3	0.751	Scrap value					7,500	5,635	-	-
4	0.683	Operating costs							(15,000)	(10,245)
4	0.683	Scrap value							5,000	3,415
PV of replacement cycle				(20,909)		(32,479)		(42,622)		(55,087)
Step 2: EAC										
PV of replacement cycle				(20,909)		(32,479)		(42,622)		(55,087)
Divided by the discount factor/ Annuity Factor				0,909		1,736		2,487		3,170
EAC				(23,000)		(18,714)		(17,139)		(17,378)

The optimum replacement policy is the one with the lowest EAC, in this case every three years.

3.5.2 Equivalent Annual Benefit

Instead of using EAC, we could also use the Equivalent Annual Benefit (EAB). This expresses the NPV of a project as an annuity. The process is the same as EAC except we use the NPV of the whole project.

 formulae	$EAC = \frac{\textit{NPV of project}}{\textit{Annuity factor for the life of the asset}}$

This is useful for comparing projects with assets that have different lives e.g. a project with a five-year machine and one with a four-year machine.

C4. Risk and uncertainty in investment appraisal

4.1 Risk and Uncertainty

4.1.1 Risk vs Uncertainty

Risk refers to a situation where the potential outcomes are known, and their probabilities can be estimated or calculated. In risk scenarios, decision-makers can use statistical methods to analyse and quantify the likelihood of different outcomes.

Uncertainty:

Uncertainty describes a situation where the potential outcomes are not fully known, or their probabilities cannot be accurately determined. In uncertain scenarios, decision-makers have incomplete information and may not be able to predict all possible outcomes.

Key characteristics of risk:	Key characteristics of uncertainty:
Measurable probability	Unmeasurable or unknown probability
Known possible outcomes	Possible outcomes may not be fully known
Can be quantified and managed	Difficult to quantify or manage precisely

To illustrate the difference:

Risk: Rolling a fair six-sided die. You know all possible outcomes (1-6) and can calculate the probability of each (1/6).

Uncertainty: The long-term effects of a new technology on society. You may be able to speculate on some outcomes, but you can't know all possibilities or their likelihoods.

In business and finance, both risk and uncertainty play crucial roles in decision-making, investment strategies, and project management. Managers and investors often use various tools and techniques to assess and mitigate risks, while also developing strategies to cope with uncertainties.

4.2 Analysing and Managing Risk

4.2.1 Expected Values

Expected Value (EV) is the average outcome of an uncertain event if it were to be repeated many times. It's calculated by multiplying each possible outcome by its probability and then summing these products.

 formulae	$E(X) = x_1p_1 + x_2p_2 + \ldots + x_np_n$, where x is the variable and p is the probability.
	This is the summation of the product of all variables and their probability.

1. Fair Coin Toss

- Heads (probability 0.5): Win FRW1
- Tails (probability 0.5): Lose FRW1

EV = (1 × 0.5) + (-1 × 0.5) = 0.5 - 0.5 = FRW0

2. Investment Opportunity

Imagine an investment with the following possible outcomes:

- 20% chance of 15% return
- 50% chance of 8% return
- 30% chance of 2% loss

EV = (15 × 0.2) + (8 × 0.5) + (-2 × 0.3) = 3 + 4 - 0.6 = 6.4%

The expected return of this investment is 6.4%.

3. Business Decision

A company is deciding whether to launch a new product:

- 40% chance of FRW100,000 profit
- 35% chance of FRW20,000 profit
- 25% chance of FRW50,000 loss

EV = (100,000 × 0.4) + (20,000 × 0.35) + (-50,000 × 0.25) = 40,000 + 7,000 - 12,500 = FRW34,500

The expected value of launching the product is a profit of FRW34,500.

Importance in Decision Making

Expected Value provides a way to evaluate choices involving uncertainty. It helps in:

1. Comparing different options.
2. Assessing the long-term viability of repeated actions.
3. Making informed decisions in business, finance, and everyday life.

However, it's important to note that Expected Value doesn't account for risk tolerance or the variability of outcomes. In some cases, especially for one-time decisions or when dealing with significant amounts, other factors may need to be considered alongside Expected Value.

4.3 Analysing and Evaluating Uncertainty

4.3.1 Sensitivity Analysis

Sensitivity analysis is a technique used to determine how different values of an independent variable impact a particular dependent variable under a given set of assumptions. In other words, it studies how the uncertainty in the output of a mathematical model can be attributed to different sources of uncertainty in its inputs.

4.3.2 Types of Sensitivity Analysis

1. One-Way Sensitivity Analysis: Examines the impact of changing one variable at a time while keeping others constant.
2. Multi-Way Sensitivity Analysis: Involves changing two or more variables simultaneously to observe their combined effect.
3. Scenario Analysis: Evaluates the impact of a specific combination of variables representing a particular scenario.
4. Monte Carlo Simulation: Uses probability distributions for inputs to generate numerous possible outcomes.

Steps in Conducting Sensitivity Analysis

1. Identify the key variables and the output of interest.
2. Set a base case scenario.
3. Define the range of variation for each input variable.
4. Calculate the output for each change in input.
5. Analyse and interpret the results.
6. Present findings (often using graphs or tornado diagrams).

Applications

1. Financial Modelling: Assessing how changes in variables like sales growth, costs, or interest rates affect financial projections.
2. Investment Decisions: Evaluating how different factors might impact the return on investment.
3. Risk Management: Identifying which variables have the most significant impact on risk exposure.
4. Project Management: Understanding how changes in timelines or resources might affect project outcomes.
5. Policy Analysis: Examining how different policy variables might influence socio-economic outcomes.
6. Environmental Studies: Assessing how various factors might impact environmental models.

Benefits	Limitations
Helps in understanding the robustness of a model or decision.	Can be time-consuming, especially for complex models with many variables.
Identifies critical variables that need closer monitoring or management.	The complexity can make it difficult to compare results.
Supports more informed decision-making by considering a range of possible outcomes.	May not capture all possible scenarios or interactions between variables.
Aids in risk assessment and management.	The quality of the analysis depends on the accuracy of input data and assumptions.

4.4 Other techniques of Managing Risk

Technique	Explanation
Discounted Payback Period	This method is like payback, but it uses considers the time value of money, which is one of the limitations for payback. This provides a more accurate measure of investment recovery time. However, it still suffers similar limitations in that it ignores cash flows beyond the payback period, and it doesn't measure profitability.

Technique	Explanation
Financial Modelling	Financial modelling is the process of creating a summary of a company's expenses and earnings in the form of a spreadsheet that can be used to calculate the impact of future events or decisions. Key components including financial statements (income statement, balance sheet) and other supporting statement like assumptions, market analysis and trend analysis documents. It can be used for valuation, risk analysis, strategic planning, budgeting and forecasting to carry out a 'What If analysis', by changing multiple variables and highlighting how these will change the outcome of individual variables and the whole project.
Monte Carlo Simulation	Monte Carlo Simulation is a computerised mathematical technique that allows people to account for risk in quantitative analysis and decision-making. This method is used for portfolio analysis, option pricing, risk management, project management and corporate finance. In project management, Monte Carlo simulation can be used to estimate the probability of completing a project within a certain time or budget, considering uncertainties in task durations and costs. **Key advantages are;** • Accounts for a wide range of possible outcomes. • Provides probabilistic results. • Helps in understanding the impact of uncertainty.

Unit C Key Terms

Key terms
Annuity C2
Annuity Factor C2
ARR C1
Artificial Intelligence C3
Breakeven C2
Compounding C2
Consumer Price Index C2
Discount factor C2
Discounted Payback C4
Discounting C2
Equivalent Annual Benefit C3
Equivalent Annual Cost C3
Equivalent annual cost (EAC) C3
Expected Values C4
Financial Modelling C4
Forecasting C3
Incremental Cashflows C1
Lease C3
Lessee C3
Lessor C3
Linear Programming C3
Monte Carlo Simulation C4
Mutually Exclusive C2

Opportunity Costs C1
Payback C1
Perpetuity C2
Probability C4
Real Options C3
Relevant costing C1
Retail Price Index C2
Sensitivity Analysis C4
Sunk Costs
Tax Allowable depreciation C2
Time Value of money C2
Trend Analysis C3
What-If Analysis C4

Summary of Unit C and key learning outcomes

Learning Outcomes	Summary
C1 Non DCF investment appraisal	In this unit, we have explored the investment decision-making process and various investment appraisal techniques. We began by examining relevant cashflows, discussing concepts such as incremental cashflows, opportunity costs, and sunk costs. The unit then focused on simple investment costing techniques, starting with the Payback method. We analysed its advantages and disadvantages, providing practical illustrations of its application. Next, we delved into the Accounting Rate of Return (ARR) method, another simple technique for evaluating investment proposals. We discussed the pros and cons of ARR and demonstrated its calculation through examples. Throughout the unit, we emphasised the importance of understanding these foundational techniques in making informed investment decisions.

Learning Outcomes	Summary
C2 DCF investment appraisal	We then delved into more sophisticated investment appraisal techniques, beginning with the crucial concept of the Time Value of Money. We explored compounding and discounting, extending these principles to annuities and perpetuities. The unit then focused on Net Present Value (NPV), explaining its calculation using discount factors and annuity tables. We introduced the Internal Rate of Return (IRR) method, comparing it with NPV and discussing its application in breakeven analysis. The concept of Modified Internal Rate of Return (MIRR) was presented as a solution to some of IRR's limitations, particularly for mutually exclusive projects. Finally, we examined advanced NPV considerations, including adjustments for inflation, tax-allowable depreciation, and working capital changes. We discussed the use of price indices and presented an advanced NPV layout to incorporate these complex factors.
C3 Further techniques and decisions in investment appraisal	We have explored advanced topics in financial decision-making and investment analysis. We began by examining Real Options, discussing various types and their evaluation in real-life scenarios, highlighting their importance in strategic decision-making. The unit then delved into Forecasting and Trend Analysis, emphasising the use of spreadsheets and the growing role of Artificial Intelligence in these processes. We then tackled Capital Rationing, exploring methods for evaluating both divisible and indivisible projects under resource constraints, and discussed the limitations of these approaches. The unit also covered Lease or Buy decisions, providing techniques for calculating leasing costs and evaluating the best option from both lessee and lessor perspectives. Finally, we examined Asset Replacement decisions, introducing the concepts of Equivalent Annual Cost and Equivalent Annual Benefit as tools for comparing assets with different lifespans.

Learning Outcomes	Summary
C4 Risk and uncertainty in investment appraisal	Finally, we examined the critical concepts of risk and uncertainty in financial decision-making. We began by distinguishing between risk and uncertainty, introducing What-If Analysis as a tool for exploring various scenarios. The section then focused on analysing and managing risk, delving into Expected Values and their calculation using probability distributions. We explored techniques for evaluating uncertainty, with a particular emphasis on Sensitivity Analysis. We discussed different types of sensitivity analysis and their applications in assessing the impact of variable changes on project outcomes. The unit concluded by introducing additional risk management techniques. We explored Discounted Payback as a risk-adjusted investment appraisal method, explored the use of Financial Modelling for more complex scenario analysis, and introduced Monte Carlo Simulation as a powerful tool for quantifying risk in situations with multiple uncertain variables. Throughout, we emphasised the importance of these techniques in providing a more comprehensive understanding of potential outcomes and risks in financial decision-making.

Unit C Quiz questions

1. Which of the following is NOT considered a relevant cashflow in the investment decision-making process?
   A) Incremental cashflows
   B) Opportunity costs
   C) Sunk costs
   D) Future operating costs

2. What is the main advantage of using the Payback method for investment appraisal?
   A) It considers the time value of money
   B) It's simple to understand and calculate
   C) It accounts for cashflows after the payback period
   D) It provides a percentage return on investment

3. The Accounting Rate of Return (ARR) is calculated as:
   A) (Average annual profit / Initial investment) x 100
   B) Initial investment / Average annual cashflow
   C) Net present value / Initial investment
   D) (Total cashflows - Initial investment) / Project lifespan

4. Which of the following statements are true regarding investment appraisal techniques and relevant cashflows? (Select all that apply)
   A) Sunk costs should be included in investment decision-making as they represent past expenditures.
   B) The Payback method considers the time value of money in its calculations.
   C) Opportunity costs, although not direct cash outflows, are relevant in investment decisions.
   D) The Accounting Rate of Return (ARR) uses average profits in its calculation.
   E) Incremental cashflows are essential in determining the financial impact of an investment.
   F) The Payback method is advantageous due to its simplicity but doesn't account for profitability.
   G) Non-relevant cashflows include future operating costs directly attributable to the investment.

H) ARR provides a percentage return, making it easy to compare projects of different sizes.

5. A company is evaluating a project with the following characteristics:

Initial investment: FRW100,000	**Annual cash flow:** FRW30,000 for 5 years	**Working capital:** FRW20,000 (recovered at end of year 5)
Cost of capital: 10%	**Inflation rate:** 3% per year	**Tax rate:** 30% **Capital allowances:** 25% reducing balance

What is the approximate inflation-adjusted NPV of this project, considering tax and working capital effects?

A) FRW15,000

B) FRW21,600

C) FRW25,000

D) FRW30,000

6. You are comparing two mutually exclusive projects:

Project	NPV	IRR	MIRR
Project A:	FRW8,676	27.3%	MIRR (at 8% reinvestment rate) = 21.0%
Project B:	FRW22,691	35.0%	MIRR (at 8% reinvestment rate) = 25.4%

The company's cost of capital is 12%. Which of the following statements is correct?

A) Project A should be chosen because it has a higher IRR

B) Project B should be chosen because it has a higher NPV

C) The decision should be based solely on the MIRR values

D) Both projects should be rejected as their IRRs are lower than the MIRR

7. A perpetuity currently pays FRW5,000 per year, growing at 2% annually. The required rate of return is 8%. What is the approximate present value of this growing perpetuity?

   A) FRW62,500

   B) FRW75,000

   C) FRW85,000

   D) FRW100,000

   If this were changed to a 20-year annuity (non-growing) with the same initial payment, what would be its approximate value?

   E) FRW49,000

   F) FRW55,000

   G) FRW65,000

   H) FRW75,000

8. Which of the following statements best describes the purpose of using Equivalent Annual Cost (EAC) in investment appraisal?

   A) To calculate the total lifetime cost of a project

   B) To compare projects with different lifespans on an annual basis

   C) To determine the initial capital outlay required for a project

   D) To estimate the annual revenue generated by a project

9. Which of the following statements are true about sensitivity analysis and its applications? (Select all that apply)

   A) One-way sensitivity analysis involves changing multiple variables simultaneously to observe their combined effect.

   B) Monte Carlo simulation uses probability distributions for inputs to generate numerous possible outcomes.

   C) Sensitivity analysis can be used in financial modeling to assess how changes in variables like sales growth affect projections.

   D) Scenario analysis evaluates the impact of a specific combination of variables representing a particular scenario.

   E) The first step in conducting sensitivity analysis is to set a base case scenario.

   F) Sensitivity analysis is not applicable in environmental studies.

   G) Tornado diagrams are often used to present the findings of sensitivity analysis.

10. An investment has the following possible outcomes and probabilities:

20% chance of FRW5,000 profit
50% chance of FRW2,000 profit
30% chance of FRW1,000 loss

What is the expected value of this investment?

A) FRW1,700

B) FRW2,000

C) FRW2,300

D) FRW2,700

Unit C References and further reading

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Unit D: The financing decision

Learning outcomes

D1. The financial markets

D2. Short term finance

D3. Long term finance

D4. Public sector funding

D5. Cost of capital

D6. Capital structure and gearing

Introduction to Unit D

In this unit, we move on to explore the intricate world of financial markets and the diverse funding mechanisms available to organisations. We will dive deep into short-term finance, examining tools and strategies for managing immediate cash flow needs.

The discussion then shifts to long-term finance, where we will analyse methods for funding substantial investments and prolonged operational requirements while also investigating the unique aspects of public sector funding, highlighting how government entities secure and allocate financial resources.

The concept of cost of capital will be thoroughly examined, providing insights into how companies evaluate and minimise their funding expenses. Lastly, we will study capital structure and gearing, exploring the critical balance between debt and equity that organisations must maintain for optimal financial health. By mastering these fundamental concepts, finance managers will be well-equipped to navigate the complex financial landscape and make informed decisions.

D1, D2 and D3 Financial Markets, Short term and Long term finance

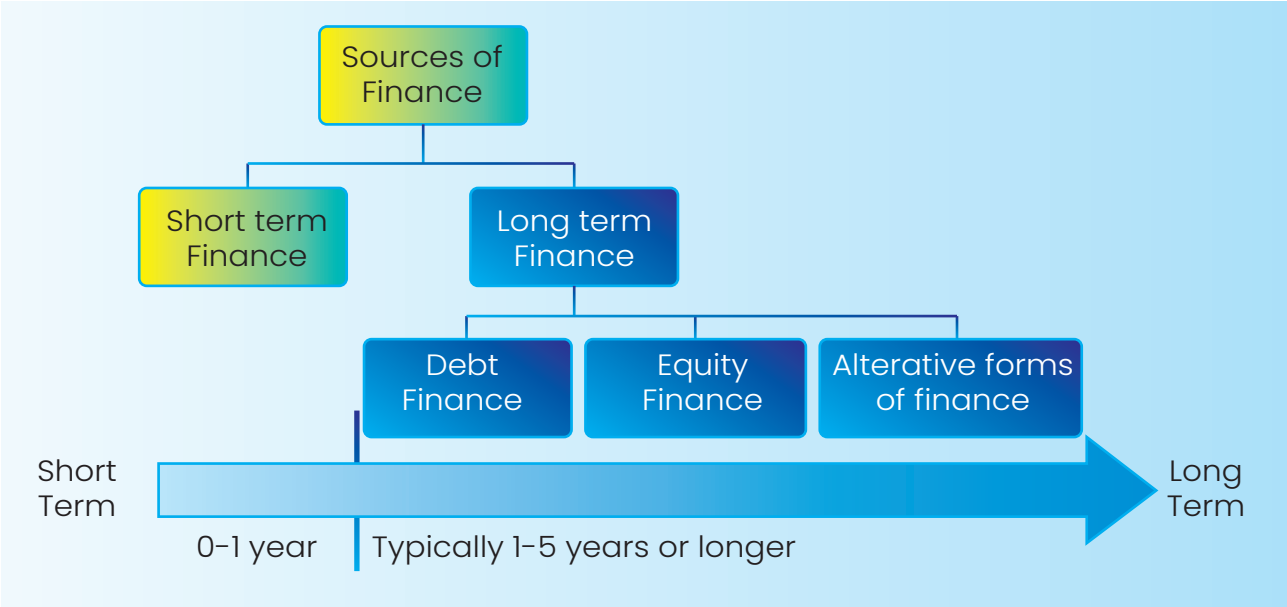

Figure 21: Sources of finance

Businesses need to make sure they match their capital needs with the term of the finance, so it is important to understand the different types of finance available to them. Below we discuss the different sources of finance

1.1. The Financial Markets

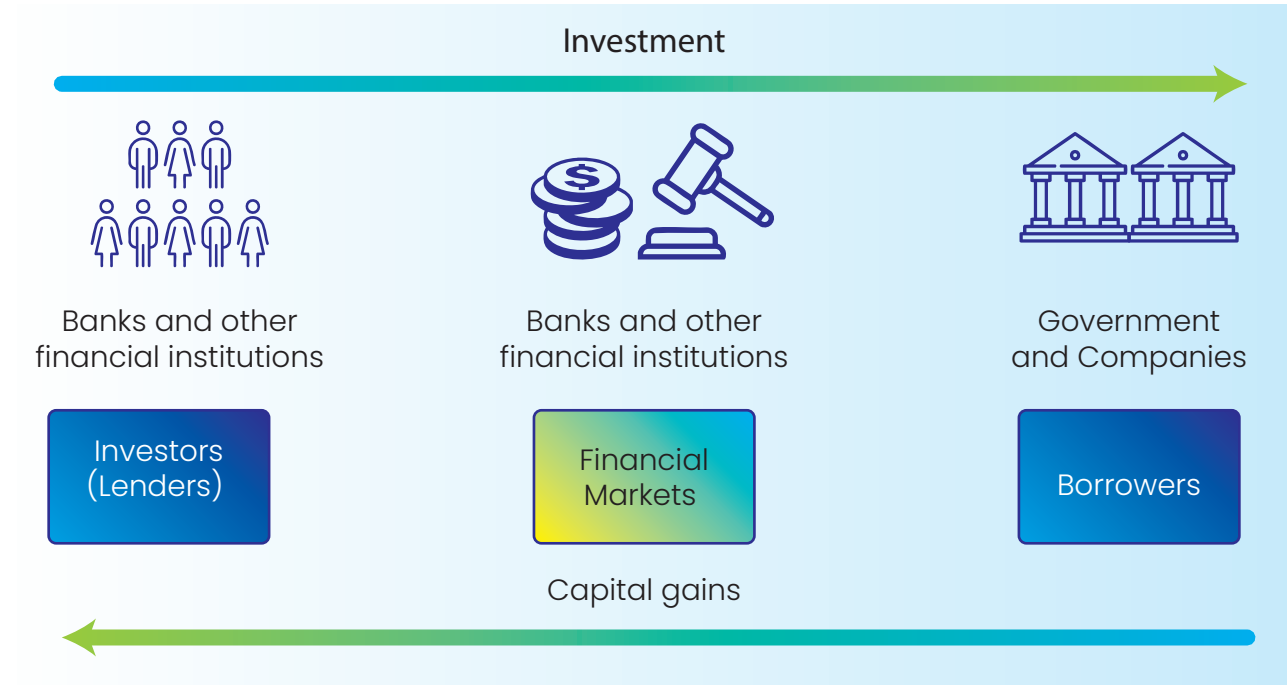

Figure 22: Structure of the financial markets

Financial markets are platforms or systems that facilitate the exchange of financial assets such as stocks, bonds, commodities, currencies, and derivatives. They play a crucial

role in the economy by enabling the efficient allocation of resources and providing a marketplace for individuals, businesses, and governments to raise capital, invest, and manage risks. In this section we will have a brief overview of the main type of markets.

	Capital Markets	**Money Markets**
Primary function:	Facilitate the **buying and selling of long-term financial instruments** (typically with maturities exceeding one year). **Connect investors** with entities seeking long-term funding.	Deal with **short-term borrowing and lending** (typically with maturities of one year or less). Provide a **platform** for managing short-term liquidity needs.
Examples of instruments:	Stocks, bonds, and other long-term securities.	Treasury bills, commercial paper, certificates of deposit.
Key roles:	1. Efficient allocation of capital. 2. Provision of liquidity for long-term investments. 3. Price discovery for financial assets. 4. Risk management through diversification.	1. Liquidity management for businesses and financial institutions. 2. Short-term funding for governments and corporations. 3. Benchmark for short-term interest rates. 4. Safe haven for temporary cash investments.

The instruments for these markets highlighted above are marketable (can be bought and sold by market participants) and this will differ from one instrument to the next. In the section below we look at the features of different type of securities.

1.1.1 Marketable securities on the financial markets

Money Market Instruments:

a) Treasury Bills (T-Bills):	• Short-term government securities. • Maturities of 4, 13, 26, or 52 weeks. • Zero-coupon instruments (sold at a discount). • Low risk, highly liquid.
b) Commercial Paper:	• Short-term, unsecured promissory notes issued by corporations. • Maturities typically ranging from a few days to 270 days. • Higher yield than T-Bills, but with slightly more risk.

c) Certificates of Deposit (CDs):	• Time deposits offered by banks. • Fixed maturity and interest rate. • Can be negotiable (tradable) or non-negotiable.

Capital Market Instruments:

a) Stocks/Shares:	• Represent ownership in a company. • No fixed maturity. • Potential for capital appreciation and dividend income. • Higher risk and potentially higher returns compared to bonds.
b) Corporate Bonds:	• Debt securities issued by corporations. • Fixed or variable interest payments (coupons). • Defined maturity date. • Generally lower risk than stocks, but higher risk than government bonds.
c) Government Bonds:	• Long-term debt securities issued by national governments. • Considered low-risk investments. • Regular interest payments and return of principal at maturity. • Examples: U.S. Treasury bonds, UK Gilts, German Bunds.
d) Municipal Bonds:	• Issued by state or local governments • Often tax-exempt at the federal level (in the U.S.) • Generally lower risk than corporate bonds
e) Exchange-Traded Funds (ETFs):	• Baskets of securities that trade like stocks • Can track various indices, sectors, or asset classes • Provide diversification and liquidity

1.2. Short Term Finance

Short term finance is often regarded as finance that is suitable for financial needs up to a year. It is important for businesses to make sure that they match their finance to the need. So, a business would not use short term finance to buy a long-term asset. Let's look at some of the short-term finance options available to a business.

1.2.1 Types of short-term finance

Type of finance	Key features	Suitability
Overdraft	An overdraft is **a flexible form of borrowing** where a bank allows a business to withdraw more money from its account than it has in its balance, up to an agreed limit. **Key features:** • Flexible - can be used as needed up to the limit. • Interest is only paid on the amount overdrawn. • Can be arranged quickly. • Often renewable annually.	Overdrafts are suitable for businesses with **fluctuating cash flows** or **seasonal demand.** They're good for managing short-term cash flow gaps or **unexpected expenses.** However, they can be **expensive if used continuously** and may be recalled by the bank at short notice.
Short term bank loan	A short-term bank loan is a loan that usually has a **term of up to a year**. This is used for short term business needs. If the business needs a loan to buy a long-term asset, they should use a long-term loan. **Key features** • Fixed amount borrowed for a set period. • Regular repayments (often monthly). • Interest rates may be fixed or variable. • May require collateral depending on the amount and the business's creditworthiness.	Short-term bank loans are suitable for specific, **one-off financing** needs such as purchasing inventory or funding a marketing campaign. They provide more certainty than overdrafts in terms of repayment schedule and interest costs.

Type of finance	Key features	Suitability
Commercial Paper	Commercial paper is an **unsecured**, short-term debt instrument issued by large corporations to raise funds, typically for a period of a few days to less than a year. It is a type of unsecured promissory note with a fixed maturity, usually less than 270 days.[5] **Key features:** • Usually sold at a discount from face value. • No interest payments - return comes from the difference between purchase price and face value. • Only available to large, creditworthy companies. • Can be a cheaper source of financing than bank loans.	Suitable for large, established companies with **strong credit ratings** who need to raise substantial amounts of short-term capital. It is often used to finance accounts receivable and inventories or to meet short-term liabilities.
Invoice discounting	Invoice discounting is a form of finance where a business **borrows money against its outstanding invoices.** This is used by businesses that have cash tied up in unpaid invoices and need to improve their cash flow. It's particularly useful for businesses with longer payment terms or those experiencing rapid growth. **Key features:** • Immediate access to a percentage of invoice value (typically 80-90%). • Business retains control of sales ledger and collects payment from customers. • Can be confidential (customers may not know the arrangement exists). • Ongoing facility that grows with sales.	Assessment of suitability for a given scenario would depend on specific factors such as: The size and creditworthiness of the business. The amount needed. The purpose of the funding. The duration for which funds are required. The business's cash flow patterns. The cost of each financing option.

[5] *You can see some examples of commercial paper from this website https: // corporatefinanceinstitute.com/resources/fixed-income/commercial-paper/*

Examples- Matching finance with the needs of the business

1. A small business needing flexible funding to manage seasonal fluctuations might find an overdraft most suitable.
2. A medium-sized company needing to finance a large inventory purchase might prefer a short-term bank loan.
3. A large corporation needing to raise substantial short-term capital might opt for commercial paper.
4. A growing business with many outstanding invoices might find invoice discounting most beneficial.

1.3 Long Term Finance

We will now move on to long term finance. We are going to group them in into the more traditional forms of long-term finance and newer forms of finance, crowd funding and peer to peer lending.

1.3.1 Types of Long-term finance

Type of finance	Key features	Suitability
Ordinary share capital:	Equity financing where investors buy shares of ownership in the company. **Key features:** • No fixed dividend payments. • Shareholders have voting rights. • No repayment obligation.	Best for **companies with strong growth potential**, willing to share ownership and control.
Preference share capital:	Preference shares have a combination of features which are **between debt and equity**, and they have priority over ordinary shares. **Key features:** • Fixed dividend payments • Usually no voting rights • Can be cumulative or non-cumulative	Suitable for **companies seeking stable financing** without diluting control.

Type of finance	Key features	Suitability
Long-term bank loan:	This is a loan with similar characteristics as the short-term loan discussed before but with a longer term. This means that the interest paid would be for a longer term but could be a lower rate. **Key features:** • Fixed or variable interest rates • Repayment schedule • May require collateral	Suitable for **established companies** with steady cash flows and assets for collateral.
Bonds:	Debt securities issued by companies to raise capital. **Key features.** • Fixed interest payments (coupons) • Repayment of principal at maturity • Can be traded on secondary markets	Suitable for **large, established** companies with good credit ratings.
Convertible debentures	Debentures are debt securities that can be converted into equity shares. **Key features:** • Lower interest rates than regular bonds • Option to convert to shares at a predetermined ratio • Combines features of debt and equity	Suitable for **growing companies** that want to attract investors with the potential for equity upside.

These forms of finance can be used by any company however, some companies might not qualify for the form of finance, or it might not be suitable to their circumstance. To assess suitability for a given scenario, we need to consider factors such as:

- The company's financial position and credit rating.
- Growth prospects and cash flow projections.
- Existing capital structure.
- Management's willingness to share control.
- Current market conditions and investor appetite.

The source above are the more traditional ones. However, business

1.3.2 Crowd funding

A method of raising capital through small contributions from many people, typically via the internet. This is an alternative way of raising finance which is not very suitable for traditional businesses without a unique selling point, businesses in highly regulated industries or companies requiring large amounts of capital quickly.

Key features	Suitability
Can be reward-based, equity-based, or donation-based. Typically involves an online platform. Often used for specific projects or ventures. Can create a community of supporters.	Startups or small businesses with innovative ideas. Projects with strong public appeal. Companies looking to validate market interest. Businesses that can offer compelling rewards or equity stakes.

1.3.3 Peer to peer loans

Online platforms that connect borrowers directly with individual lenders, bypassing traditional financial institutions. Just like crowd funding peer to peer loans are not suitable for traditional businesses, large corporations needing substantial funding, businesses with poor credit histories and companies in high-risk industries.

Key features	Suitability
Often offer more competitive interest rates than traditional banks. Can have faster approval processes. May be more accessible for businesses with less established credit histories. Typically, unsecured loans.	Small to medium-sized businesses. Companies with good credit scores but limited operating history. Businesses looking for alternatives to traditional bank loans. Firms needing quick access to capital.

Real world Example

Funding Circle, a major peer-to-peer lending platform, facilitated a £100,000 loan for Smith & Sons Electrical Ltd., a UK-based electrical contractor with 15 employees. The company sought funds to purchase equipment and hire staff.

After an online application, Funding Circle's algorithm assessed the risk and listed the loan at 8.9% APR over 60 months. Multiple investors funded the loan within 24 hours, with no single investor contributing more than 1%. The company received funds within a week.

Using the capital, Smith & Sons bought specialised equipment and hired two apprentices, increasing capacity by 30% and growing annual revenue by 25% the following year. The loan was repaid on schedule through automatic monthly deductions.

This example showcases how P2P lending can offer SMEs faster access to capital than traditional banks while providing investors with diversification opportunities. However, P2P lending, like all financing options, carries inherent risks and potential for higher interest rates.

1.3.4 Grants

Grants are another source of finance that is also available to companies. These are non-repayable funds provided by government agencies, foundations, or corporations, typically for specific purposes or projects.

Since grants are specialised, they are not application to all businesses. Hence, they are likely not applicable to traditional for-profit businesses without a strong social or innovative component, companies needing unrestricted funds and businesses unwilling to comply with extensive reporting requirements.

Key features	Suitability
• No repayment required. • Often come with specific conditions or reporting requirements. • Can be highly competitive. • May be focused on particular industries, regions, or social impacts.	• Non-profit organisations. • Businesses engaged in research and development. • Companies working on socially beneficial or innovative projects. • Startups in specific industries (e.g., clean energy, healthcare).

1.4 Equity Finance

1.4.1 Raising Equity finance

When raising equity finance a company will have several options. The option they pick will depend on their situation

Initial Public Offer (IPO)

An IPO is an offer for sale of shares to the public using a fixed price or through a tender process. This is used by a company that does not have any public shares, and they are listing shares for the first time.

Placing

A placing is an issue of shares at a fixed price almost like the IPO, but this is placed onto institutional investors. This makes the process quicker, but this is often more expensive.

Rights Issue

A rights issue is an issue of shares only to the existing shareholders of the company. Shareholders are given the right to buy share at a certain price which is usually at a discount. Shareholders have the right to buy the shares, sell their rights or a mix of the above.

Real world Example
Initial Public Offering (IPO) Example: Airbnb (2020)
Airbnb, the popular home-sharing platform, went public on December 10, 2020.
Initial share price: $68
Shares offered: 51.5 million
Capital raised: Approximately $3.5 billion
First-day closing price: $144.71 (112% increase)
This IPO was notable for its timing during the COVID-19 pandemic, which had significantly impacted the travel industry. Despite initial concerns, Airbnb's successful IPO demonstrated strong investor confidence in its long-term prospects.
Placing Example: Ocado Group PLC (2020)
Ocado, a British online supermarket, conducted a placing in June 2020.
Shares placed: 33.5 million new ordinary shares
Placing price: 1,960 pence per share
Capital raised: Approximately £1 billion

Real world Example

Purpose: To fund growth opportunities in the online grocery market

This placing allowed Ocado to quickly raise a large amount of capital from institutional investors without the time and expense of a rights issue or public offering.

Rights Issue Example: International Airlines Group (IAG) (2020)

IAG, the parent company of British Airways and Iberia, launched a rights issue in September 2020.

Rights issue ratio: 3 new shares for every 2 existing shares

Subscription price: €0.92 per new share

Capital raised: Approximately €2.74 billion

Purpose: To strengthen the group's balance sheet and liquidity position during the COVID-19 crisis

This rights issue allowed existing shareholders to maintain their proportional ownership in the company while providing IAG with much-needed capital during a challenging period for the airline industry.

Theoretical Ex-Rights Price (TERPS)

When a company issues a rights issue, the share price will theoretically drop and then increase based on the activity on the market. This drop in share price is called TERPs. Let's use the illustration below to demonstrate how this works.

formulae	$TERPS = \frac{(N \times \text{cum rights price}) + \text{issue price}}{N+1}$
	Where N is the number of shares required to have the right to buy 1 new share.

Key Terms

Cum-rights:

"Cum-rights" refers to shares that are trading with the rights attached. When a stock is trading cum-rights, the buyer of the shares is entitled to participate in the upcoming rights issue. The cum-rights period typically ends a few days before the rights issue begins.

Value of a Right:

The value of a right represents the economic benefit that an existing shareholder receives from being able to buy new shares at a discount. It's essentially the **difference between the market price of the stock** and the **subscription price of the new shares**, adjusted for the rights ratio.

Illustration

A company is planning a rights issue with the following details.

Current share price: FRW10	Number of existing shares: 1,000,000
Rights issue ratio: 1 for 4 (1 new share for every 4 existing shares)	Subscription price for new shares: FRW8

Required: Calculate the number of shares issued and the TERPS

Solution

Step 1: Calculate the number of new shares to be issued

New shares = Existing shares ÷ Rights ratio New shares = 1,000,000 ÷ 4 = 250,000

Step 2: Calculate the total value of the company before the rights issue

Value before rights = Current share price × Number of existing shares Value before rights = FRW10 × 1,000,000 = FRW10,000,000

Step 3: Calculate the additional capital raised through the rights issue

New capital = Number of new shares × Subscription price new capital = 250,000 × FRW8 = FRW2,000,000

Step 4: Calculate the total value of the company after the rights issue

Value after rights = Value before rights + New capital Value after rights = FRW10,000,000 + FRW2,000,000 = FRW12,000,000

Step 5: Calculate the total number of shares after the rights issue

Total shares after rights = Existing shares + New shares Total shares after rights = 1,000,000 + 250,000 = 1,250,000

Step 6: Calculate TERPS

TERPS = Value after rights ÷ Total shares after rights TERPS = FRW12,000,000 ÷ 1,250,000 = FRW9.60

Therefore, the Theoretical Ex-Rights Price (TERPS) is FRW9.60.

Alternatively.

This can be calculated as;

	FRW
4 shares @ FRW10	**= 40**
1 share @ FRW8	**8**
5 shares	**48**

TERPS =FRW40/FRW8 = FRW9.60

D4 Public Sector Funding

2 Public Sector funding

Public sector organisations rely on diverse funding sources to support their operations and initiatives. This section explores the various types of finance available, from traditional methods to innovative approaches. The funds that are available to include Treasury Bonds (government bonds), taxes and donations. We discuss these briefly next.

2.1 Types of funds available to public sector

Treasury bonds (Government securities)	Treasury bonds are a crucial form of finance for public sector organisations, particularly at the national level. These securities allow the government to borrow money from investors, promising to repay the principal with interest over time. They are debt instruments issued by the government to raise funds which can be split into; **Long-term bonds**: Usually with maturities of 10 years or more. **Medium-term notes:** Typically, with 2–10-year maturities. **Short-term bills:** Generally, with maturities of less than one year.
Taxes	Taxes are a primary source of finance for public sector organisations at all levels of government. **Income taxes:** Levied on individual and corporate earnings. **Property taxes:** Based on the value of real estate and often used to fund local government services. **Sales taxes:** Applied to the sale of goods and services. **Excise taxes:** Imposed on specific goods like fuel, tobacco, or alcohol.

Donations	While not typically a major source of funding for most public sector organisations, donations can play a role, especially for certain types of institutions: Public universities often rely heavily on alumni donations. Cultural institutions like public museums may receive significant private donations. Some government programs may accept voluntary contributions.
Other sources	Intergovernmental transfers **User fees and charges for specific services:** National Park entrance fees. Public transportation fares. Parking meters and fines. Public-Private Partnerships (PPPs) Municipal bonds. Asset sales. Governments may sell assets (e.g., land, buildings, or state-owned enterprises) to raise funds.

D5 Cost of capital

Now that we understand the different types of finance options, it is equally important to recognise that most organisations utilise a combination of these sources. This mix of finance, known as the capital structure, plays a significant role in a company's financial strategy and performance.

Organisations typically employ a blend of financing methods, each with its own cost and risk profile. Each of these financing sources comes with different interest rates or expected returns for investors. The collective cost of these various funding sources is referred to as the company's "cost of capital".

In the following section, we explore how this diverse mix of financing impacts a business's overall cost of capital. Understanding this concept is crucial for making informed financial decisions, as it directly affects a company's profitability, valuation, and ability to fund future growth initiatives.

3.1 Risk return relationship

The cost of capital normally reflects the risk taken by the provider of finance. Hence, if a finance provider has high risk, they will expect a higher return from their investment otherwise they would not provide the finance. The graphic below shows the spectrum of risk for the difference sources of finance,

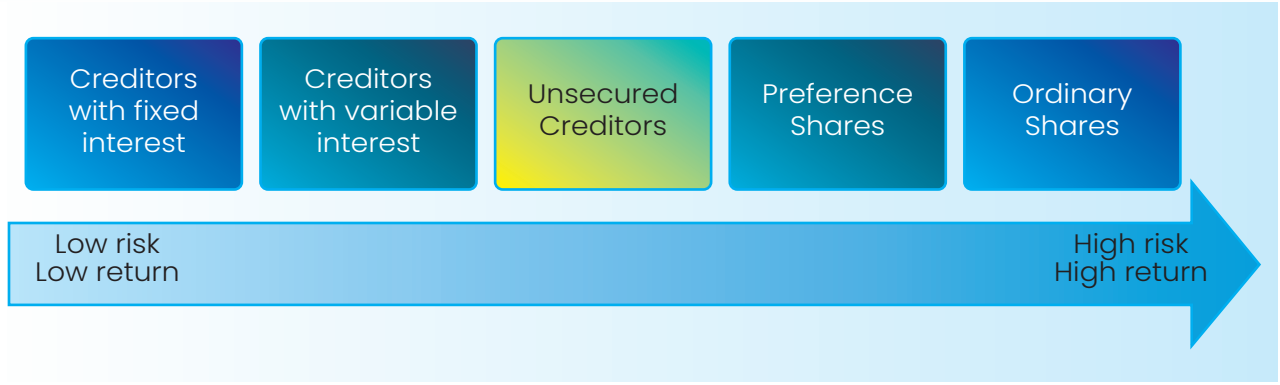

Figure 23: The risk-return relationship based on the type of finance

Debt finance- has the lowest risk if secured followed by unsecured debt, hence this will have the lowest return expectations from providers of finance. This is denoted by cost of debt (Kd).

Ordinary shares (Ke)- these normally have the highest risk since they are always paid last after everyone else, hence, high risk-high expectations of return. This is the most expensive source of finance.

Preference shares (Kpref)- These face higher risk than debt because they will be paid after debt has been paid, hence, this will be above debt but below Ke.

We have seen that risk changes based on the instrument used, let us now look at how risk can be minimised by looking an investor who decides to invest in shares. One common way of reducing risk exposure would be to diversify the portfolio of shares. For example, an investor can invest in a company that does well in a rainy season, like a company that sells umbrellas, then diversify by investing in a company that sells warms clothes for winter season. Since these companies do well in different seasons, the investor has diversified. However, they can never reduce risk down to zero. This is due to systematic and unsystematic risk.

3.1.2 Unsystematic risk

Key Term	Unsystematic risk (also known as specific or idiosyncratic risk): This is the risk associated with a particular company or industry.

Diversification is effective in reducing unsystematic risk because poor performance in one sector (e.g., the umbrella company in the summer) may be offset by strong performance in another (e.g., the warm clothing company in the winter).

3.1.1 Systematic risk

Key Term	Systematic risk (also known as market risk): This is the risk inherent to the entire market or a market segment.

Factors like economic recessions, political instability, or global financial crises affect all companies and industries to some extent. No matter how diversified your portfolio is, you

can't eliminate systematic risk because it impacts the whole market.

This can be further illustrated using the diagram below;

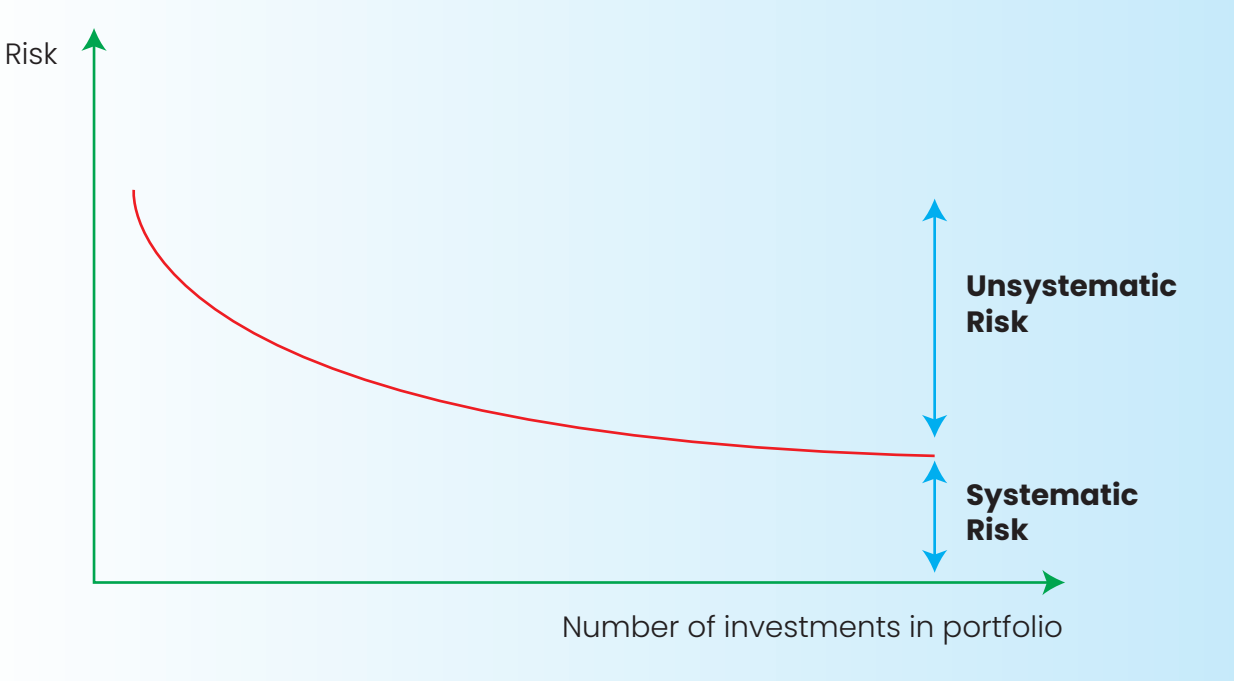

Figure 24: Effects of portfolio diversification as a risk reduction technique

The systematic risk graph above illustrates how increasing the number of assets in a portfolio reduces unsystematic (company-specific) risk but cannot eliminate systematic (market-wide) risk. It shows total portfolio risk decreasing as more assets are added, approaching but never falling below the systematic risk level, which remains constant.

Beta, a measure of systematic risk, represents an asset's sensitivity to market movements. Assets with higher betas are more volatile relative to the market, while those with lower betas are less volatile. The graph demonstrates that even in a well-diversified portfolio, beta-driven systematic risk persists.

3.1.3 Beta factors

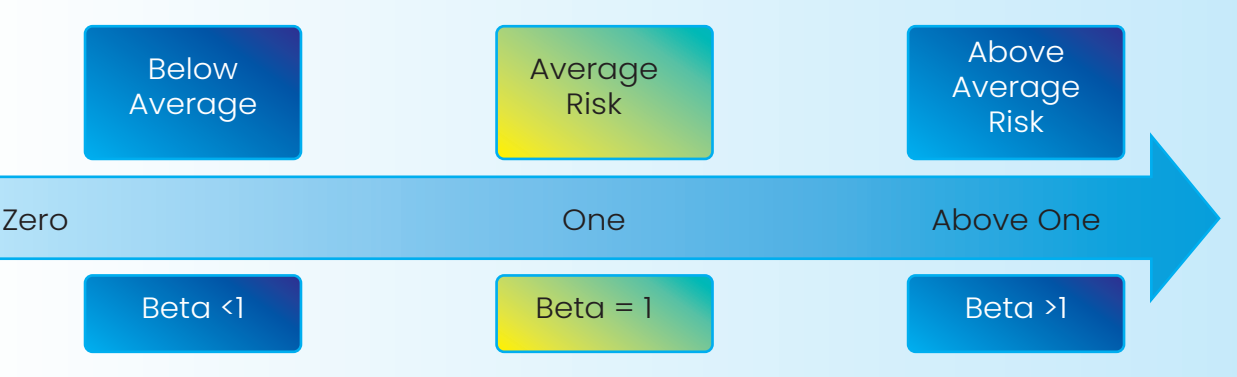

Figure 25: Criteria for interpreting beta values

Beta factor < 1	Beta factor = 1	Beta factor >1
Beta < 1 indicates lower volatility than the market. A beta of 0.5 means the asset tends to move half as much as the market.	A beta of 1.0 indicates that the asset moves in line with the market.	Beta> means the asset is more volatile than the market. For example, a beta of 1.5 suggests the asset's price tends to move 50% more than the market in either direction.
The return expected by shareholders will be less than the market average since the risk is lower.	The return expected by shareholders will be less than the market average since the risk is lower.	The return expected by shareholders will be less than the market average since the risk is lower.


Key Term

Beta factors; measures the sensitivity of an asset's returns to movements in the overall market. It quantifies the volatility of an individual stock or portfolio relative to the broader market.

Negative beta is rare but indicates inverse movement to the market.

Beta is a key component of the Capital Asset Pricing Model (CAPM) used in calculating expected returns.

3.2 CAPM

CAPM stands for Capital Asset Pricing Model. It's a financial model used to determine the expected return on an investment, particularly for shares.


formulae

CAPM formula: **$E(Ri) = Rf + \beta i(E(Rm) - Rf)$, where $E(Rm) - Rf$** is the market risk premium.


Key Term

Market risk premium = Expected market return - Risk-free rate.

This represents the additional return investors expect to receive for taking on the risk of investing in the market portfolio compared to investing in a risk-free asset.

3.2.1 Estimating CAPM

Let's see how CAPM is used to estimate Ke if we are given the following;

Risk-free rate (Rf) = 2%	**Expected market return (Rm) = 8%**
Beta **(β)** of the stock = 1.2	

Step 1: Calculate the market risk premium

Market risk premium = Expected market return - Risk-free rate

Market risk premium = 8% - 2% = 6%

Step 2: Apply the CAPM formula

CAPM formula: **E(Ri)** = **Rf + βi** (Rm - Rf)

Where:

E(Ri) = Expected return of investment

Rf = Risk-free rate

βi = Beta of the investment

Rm - Rf = Market risk premium

Plugging in our values:

E(Ri) = 2% + 1.2(6%)

E(Ri) = 2% + 7.2%

E(Ri) = 9.2%

Therefore, according to CAPM, the expected return of this share is 9.2%.

3.2.2 Assumptions of CAPM

Assumptions
1. Investors are rational and risk averse.
2. Markets are efficient and information is freely available.
3. All investors have the same expectations about risk and return.
4. There are no transaction costs or taxes.
5. All assets are perfectly divisible and liquid.
6. Investors can borrow and lend at the risk-free rate.
7. There's a linear relationship between risk and return.

3.2.3 Advantages and Disadvantages of CAPM

Advantages	Disadvantages
1. Simple and easy to understand. 2. Forward looking. 3. Useful for stable companies. 4. Incorporates risk. 5. Focuses of the fundamentals. 6. Aligns with value creation principles. 7. Helps in comparative analysis.	1. Oversimplification of real-world markets. 2. Relies on unrealistic assumptions. 3. Uses historical data to predict future returns. 4. Difficult to determine an accurate beta. 5. Ignores company-specific risks. 6. Assumes all investors have the same time horizon. 7. Does not account for market anomalies or behavioural factors.

Given the drawbacks and assumptions listed above, an alternative to CAPM can be used. This is the Dividend Growth Model.

3.3 Dividend Growth Model

DVM is a method used to value shares based on the theory that a shares value is the present value of all its future dividend payments. We can use the following formula,

formulae	$re = \frac{D_o(1+g)}{P_o} + g$
	Where D_o *is the most recently paid dividend* P_o *is the price of a share today* *g is the expected future growth*

3.3.1 Estimating DVM

To estimate DVM, we need the growth (g). There are two ways of estimating g;

1. Using historic growth of dividends.
2. Using current reinvestment levels

1.Using historic growth of dividends.

To estimate this, we need to start by estimating the growth (g) using historic dividend. Suppose we are given the historic dividend as;

Year 1	Year 2	Year 3	Year 3	Year 5
FRW3.0	FRW3.8	FRW4	FRW4.8	FRW5.2

We can **estimate the growth of the dividend** using the present value and future value formula;

FV - PV $(1 + r)^t$, where FRW 5.20 is our FV, FRW 3 is our PV, t will be 4 - which is the number of yeard it takes FRW 3 to grow to FRW 5.2 and r the rate of growth (g).

This becomes, FRW 5.2 = FRW $2(1 + g)^4$,

If we make g the subject of the formular we get $g = \sqrt[4]{\frac{\text{FRW } 5.2}{\text{FRW } 3}} - 1$, this is approximately equal to 15%

formulae	$1 + g = \sqrt[n]{\frac{\text{Letest dividend (FRW 26 in our example)}}{\text{Earliest dividend (FRW 26 in our example)}}}$
	Where n is the number of growth periods

Once we know the growth (in this case 15%), we can now use it to calculate the cost of equity using DVM

Assuming a share price of FRW6.5

$$re = \frac{D_o\,(1 + g)}{P_o} + g \text{ becomed } re \quad \frac{\text{FRW } 5.2\,(1 + 15\%)}{\text{FRW } 6.5} + 15\% = 19.60\%$$

2. Using current reinvestment levels

In some instances, you might have a company that does not pay dividend, so you use the reinvestment level of profits. For this we will need;

And we use the formula

formulae	$g = br_e$	
	*Where **b** is the balance (%) of profits reinvested and $\mathbf{r_e}$ is on the invested funds*	

Let's use another example to illustrate this;

If a company retains 60% of its earnings for capital investments projects and the projects are expected to have a return of 10%, then the dividend growth can be estimated as

$g - br_e - 60\% \times 10\% = 6\%$

Once we have calculated g, we can use it in the DVM like in option 1.

3.3.2 Assumptions of DVM

Assumptions
1. Investors are rational and risk averse.
2. Markets are efficient and information is freely available.
3. All investors have the same expectations about risk and return.
4. There are no transaction costs or taxes.
5. All assets are perfectly divisible and liquid.
6. Investors can borrow and lend at the risk-free rate.
7. There's a linear relationship between risk and return.

3.3.3 Advantages and Disadvantages of DVM

Advantages	Disadvantages
1. **Focus on tangible returns:** It emphasises actual cash returns to shareholders through dividends, which are concrete and measurable.	1. **Limited applicability:** Not suitable for companies that don't pay dividends or have irregular dividend policies, which includes many growth-oriented firms.
2. **Simplicity:** The basic model is relatively straightforward to understand and apply compared to some other valuation methods.	2. **Ignores retained earnings:** The model doesn't account for earnings reinvested in the business, which could lead to future growth and value creation.
3. **Suitable for stable companies:** Works well for mature companies with consistent dividend policies, especially in sectors like utilities or consumer staples.	3. **Sensitive to assumptions:** The model relies heavily on forecasts of future dividends and growth rates, which can be highly uncertain.
	4. **Discount rate subjectivity:** Choosing an appropriate discount rate can be challenging and subjective, significantly impacting the valuation.

4. **Considers time value of money:** By discounting future dividends, it accounts for the fact that money received sooner is more valuable.
5. **Alignment with shareholder perspective:** Directly relates to shareholder returns, which is often a key concern for investors.
6. **Useful for comparing stocks:** Allows for comparison between dividend-paying stocks across different industries.

5. **Overlooks non-dividend value drivers:** It doesn't consider other factors that might affect a company's value, such as brand strength, market position, or intellectual property.
6. **Short-term focus:** May encourage short-term thinking by prioritising immediate dividend payments over long-term investment and growth.
7. **Ignores broader market context:** The model doesn't inherently account for overall market conditions or comparative valuations of similar companies.

3.4 Cost of debt

Once we have calculated the cost of equity, if a company has debt, we will need to consider the cost of this debt. This cost (Kd) will depend on the type of debt the business has.

3.4.1 Types of debt

Debt varies in form, with each type influencing its associated cost or the required rate of return (Kd) for financing options. We'll examine diverse debt categories and explore how to calculate the cost of debt (Kd) for each. This analysis will provide insights into the financial implications of different borrowing strategies.

3.4.2 Irredeemable debt

These are loan notes that entitle the holder to receive interest indefinitely without receiving any redemption amount at the end. This is quite similar to receiving a dividend in the same was we saw when we looked at the dividend growth model, except there is no growth in the amount received, which makes it a perpetuity. Therefore, we can adopt the dividend growth model as follows;

formulae	$K_d\ (pre - tax) = \frac{1}{P_o}$
	i=interest and P_o *market value of the debt*

Example

A company has a 9% irredeemable loan note issued which is trading at 90% of the nominal value of FRW100. What is the cost of debt.

Solution

$$K_d\ (pre-tax) = \frac{1}{P_o} = \frac{9}{90} = 10\%$$

Par value is always FRW100 even if the question does not mention this.

Another point to note is that this question does not consider the impact of tax. As financial managers, we consider debt beneficial because we deduct interest before tax hence, we save on tax. When we consider the final impact of this, we can adopt our calculation as follows;

formulae	$K_d\ (post-tax) = \frac{1\ (1-tax)}{P_o}$
	i=interest, t the tax rate and = market value of the debt

So, now if we introduce a tax rate of 20% to our calculation we get,

$$K_d\ (post-tax) = \frac{1\ (1-tax)}{P_o} = \frac{9\ (1-20\%)}{90} = 8\%$$

3.4.3 Redeemable debt

These are loan notes that entitle the buyer/holder to an interest, but they also get to redeem the nominal value or at a market premium after a defined period, for example, 5 years.

A typical example of redeemable debt would look like the one below,

Year	0	1	2	3	4	5
Buyer pays for loan notes	(90)					
Interest		10	10	10	10	10
Redemption						100

In the example above the investor/buyer would pay FRW90 to buy the loan note, they will receive interest of FRW10 for 5 years and finally receive FRW100 at redemption. To be able to calculate the cost of this, we would need to consider tax, time value of money and calculate the IRR of this debt instrument.

If we assume tax is 20%, the IRR calculation would look like this.

Year	0	1	2	3	4	5
Buyer pays for loan notes	(90)					
Post tax interest (20%)	8	8	8	8	8	
Redemption						100
Net cashflows	(90)	8	8	8	8	108
NPV @ 10%	2					
NPV @ 20%	26					

We can now use the IRR formula we saw in Unit A,

formulae	$IRR = a\% + \frac{NPVa}{NPVa - NPVb}(b\% - a\%)$
	i=interest, t the tax rate and = market value of the debt

$$\textit{So the IRR} = 10\% + \frac{2}{2 - (-26)}(20\% - 10\%) = 11\%$$

Therefore, the IRR for this 11%, which means that the cost of debt (Kd) is 11%.

Example 2

Let's look at the calculation of an 8% irredeemable loan note that is redeemable at a premium of 15%, with a market value of FRW90 and last for 4 years. Tax is 20%.

Calculation

Year	0	1	2	3	4
Buyer pays for loan notes	(90)				
Post tax interest (20%)		6.40	6.40	6.40	6.40
Redemption					115
Net cashflows	(90)	6	6	6	121
NPV @ 10%	9				
NPV @ 20%	(18)				

formulae	$IRR = a\% + \frac{NPVa}{NPVa - NPVb}(b\% - a\%)$

$$So\ the\ IRR = 10\% + \frac{9}{9 - (-18)}(20\% - 10\%) = 13\%$$

This loan note has a Kd of 13%.

CAPM Approach

Redeemable debt is a tradable asset which could have a beta factor just like shares. If the beta factor is available, we can calculate the cost of debt using the CAPM approach we used for shares.

Example

If debt has a debt beta of 0.4 and the market return is expected to be 12% when the risk-free rate is 6%, we can calculate the cost of debt as;

CAPM formula: $E(Ri) = Rf + \beta i(E(Rm) - Rf$

$E(rd) = 6\% + 0.4(12\%-6\%) = 8.4\%$.

Once we know what the return is when can then adjust for tax. If the tax is 20% then this becomes;

$Kd = 8.4\% (1-20\%) = 6.72\%$

3.4.4 Convertible debt

Convertible debt would be similar to redeemable debt except that the holder would have a choice of either redeeming at par (i.e. redeeming at FRW100) or converting to shares. For example, if the holder in the previous example was given the choice of converting to 20 shares instead of a redemption at a premium of 15%. The choice they would make would depend on the share price. Let's look at the choice they would make if the share prices where FRW5 and FRW6 respectively;

Scenario 1	Scenario 2
Convert to 20 shares @ FRW5 = FRW100	Convert to 20 shares @ FRW6 = FRW120
Redemption at premium = FRW115	Redemption at premium = FRW115
Choice= redemption at premium	**Choice= convert to shares**

The outcome of scenario 1 would be the same as example 2 above as the holder would choose redemption at a premium. However, scenario 2 would be slightly different;

Year	0	1	2	3	4
Buyer pays for loan notes	(90)				
Post tax interest (20%)		6.40	6.40	6.40	6.40
Redemption					120
Net cashflows	(90)	6	6	6	126
NPV @ 10%	12				
NPV @ 20%	(16)				
IRR	14%				

In the scenario 2, the redemption value in the calculation would change to FRW120, which changes the IRR to 14%

3.4.5 Preference Shares

Preference shares are fairly straight forward since they do not grow, the same dividend/ interest is paid every year so we can use the Dividend Valuation model and remove the **g** and tax since they are paid after tax.

The formula changes to become,

$$re = \frac{D_o (1 + g)}{P_o} + g$$ *if we do not have a g then becomes;*

formulae	$Kpref = + \frac{D_o}{P_o}$
	Where is the dividend/interest and is the price of the preference shares.

3.4.6 Bank Loan

This is another straightforward one. The bank loan is always given since the bank determines what interest they will charge to their clients. In the exam, this will always be given. The only adjustment we need to make is tax. Therefore, the cost of a bank loan becomes;

formulae	*Cost of bank loan=bank rate* ***(1-tax)***

3.5 WACC

In reality, and in the exam, a company will have more than one source of income. For example, a company could have equity, preference shares, loan notes and a bank loan. This means that we would need to calculate an average cost of all these sources of finance to be able to use this in our capital calculations for our projects. This average cost is the Weighted Average Cost of Capital (WACC). This is calculated using this formula;

formulae	$WACC = \left(\frac{V_e}{V_e + V_d}\right) K_e + \left(\frac{V_d}{V_e + V_d}\right) K_d (1 - tax)$
	Where V_e is the total market value (ex - div) of share i.e. market capitalisation *V_d is the total market value (ex - interest) of debt* *K_e is the cost of equity in a general company* *K_d is the cost of debt*

Example

Let's assume XYZ Corporation has the following capital structure:

Equity (E): FRW50 million	Preference Shares (P): FRW10 million
Bank Loan (D): FRW20 million Convertible Loan Stock (C): FRW15 million	

Total capital: FRW95 million

The cost of each source of finance are given as follows;

Cost of Equity (Ke): 12%	Cost of Preference Shares (Kpref): 8%
Cost of Bank Loan (kb): 8% (before-tax)	Cost of Convertible Loan Stock (Kd): 7%

Corporate Tax Rate (T): 25%

Solution

formulae	$WACC = \left(\frac{V_e}{V_e + V_d}\right) K_e + \left(\frac{V_d}{V_e + V_d}\right) K_d (1 - tax)$
	Where V_e is the total market value (ex - div) of share i.e. market capitalisation *V_d is the total market value (ex - interest) of debt* *K_e is the cost of equity in a general company* *K_d is the cost of debt*

Weight of Preference Shares (P/V): 10/95 = 0.1053

Weight of Equity (E/V): 50/95 = 0.5263

Weight of Bank Loan (D/V): 20/95 = 0.2105

Weight of Convertible Loan Stock (C/V): 15/95 = 0.1579

Now, let's calculate the WACC:

WACC = (0.5263 × 12%) + (0.2105 × 8% × (1-0.25)) + (0.1053 × 8%) + (0.1579 × 7%)

Breaking it down:

Equity component: 0.5263 × 12% = 0.06316

Bank Loan component: 0.2105 × 8% × (1-0.25) = 0.01263

(Note: The (1-0.25) factor accounts for the tax shield on interest)

Preference Shares component: 0.1053 × 8% = 0.00842

Convertible Loan Stock component: 0.1579 × 7% = 0.01105

WACC = 0.06316 + 0.01263 + 0.00842 + 0.01105 = 0.09526

WACC = 9.53%

Explanation of tax calculation:

The bank loan's cost is adjusted for tax because interest payments are tax-deductible. The effective after-tax cost of debt is calculated as kb × (1-T). In this case, it's 8% × (1-0.25) = 6%. This lower effective cost reflects the tax benefit of using debt financing.

This WACC of 9.53% represents XYZ Corporation's overall cost of capital, accounting for all financing sources and their respective costs, including the tax benefit of debt. The company would use this rate as a benchmark for evaluating new investments.

Exam Focus

In the exam, you are likely to calculate WACC by calculating the individual costs of each source of finance using the formulas given above. Once you have the Ke and Kd, you can then calculate the WACC using the method explain above.

D6 Capital structure and gearing

Let us now briefly consider capital structure and gearing, crucial aspects of corporate finance that significantly impact a firm's value and risk profile. Understanding these concepts is vital for financial managers, investors, and analysts alike. We'll explore traditional and modern theories, including Modigliani and Miller's theories, to grasp the theoretical foundations of capital structure decisions. By examining practical factors influencing financing choices and learning to calculate operating and financial gearing, we can gain valuable insights into how companies optimise their financial structure. This knowledge is essential for making informed decisions about leverage, risk management, and value creation in today's complex business environment.

4.1 Traditional Theory

The traditional theory of capital structure suggests that there is an optimal mix of debt and equity that maximises a firm's value and minimises its overall cost of capital (WACC). This theory proposes that:

As a firm begins to use debt, which is generally cheaper than equity, the WACC decreases and firm value increases. This benefit continues up to a certain point due to the tax-deductibility of interest and the disciplining effect of debt on management.

However, beyond this optimal point, the cost of financial distress and bankruptcy risk start to outweigh the benefits of debt. Therefore, there's an optimal capital structure where the marginal benefits of debt equal its marginal costs.

This theory implies that firms can increase their value by moving towards this optimal capital structure.

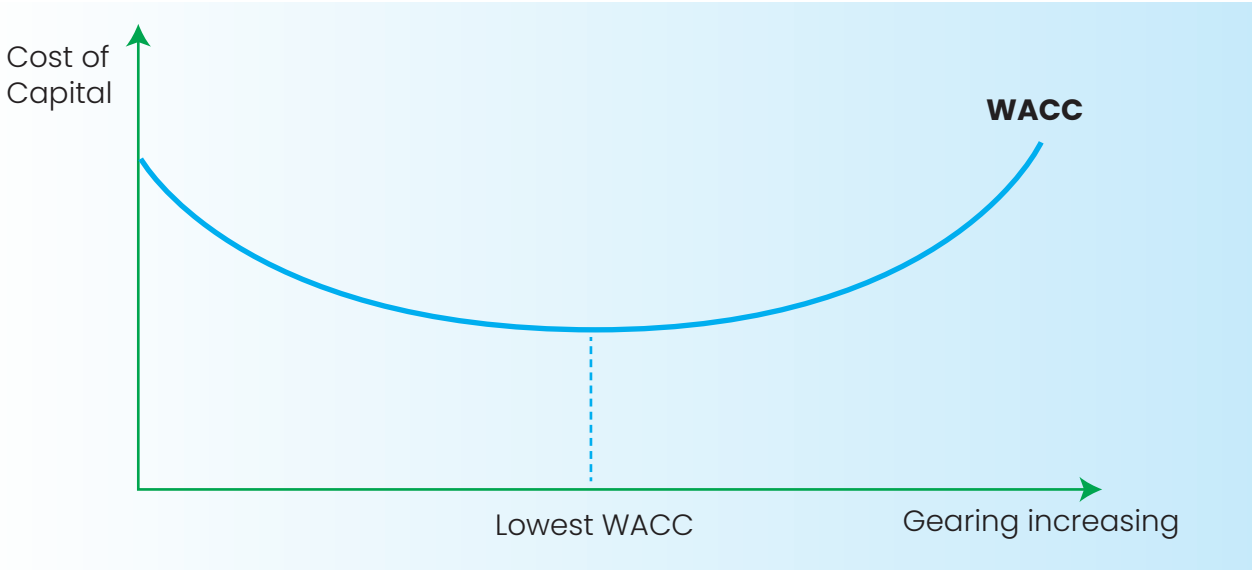

Figure 26: The traditional theory

4.2 M&M Theories

4.2.1 M&M without tax

Modigliani and Miller's first proposition (1958) challenged the traditional view. In a world without taxes, they argued that:

- The value of a firm is independent of its capital structure.
- The total market value of a firm is determined by its asset risk class and expected return, not by how it's financed.
- As debt increases, the cost of equity rises to offset the cheaper cost of debt, keeping the WACC constant.
- This occurs because increasing debt increases financial risk for shareholders, who then demand higher returns.
- Any attempt to substitute cheaper debt for equity is offset by the increased riskiness and cost of the remaining equity.

This theory assumes perfect capital markets, no transaction costs, no bankruptcy costs, and equal borrowing costs for companies and investors.

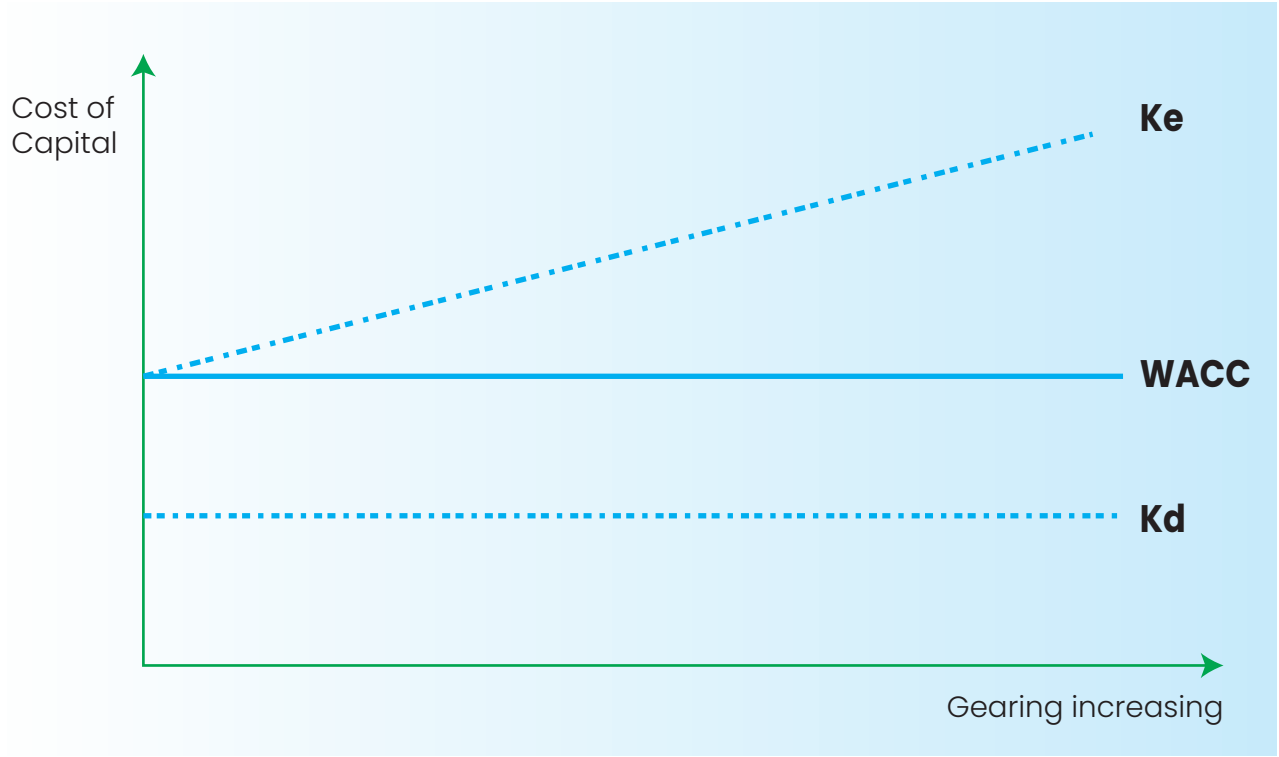

Figure 27: M&M without tax theory

4.2.2 M&M with tax

In 1963, MM revised their theory to include corporate taxes:

- With corporate taxes, the value of a levered firm is equal to the value of an unlevered firm plus the present value of the tax shield provided by debt.
- As interest payments are tax-deductible, debt provides a tax shield that increases the firm's value.
- The more debt a company uses, the more valuable it becomes due to the increasing tax shield.
- Theoretically, this implies that the optimal capital structure is 100% debt financing.
- However, this extreme conclusion is moderated in practice by factors such as personal taxes, bankruptcy costs, and agency costs.

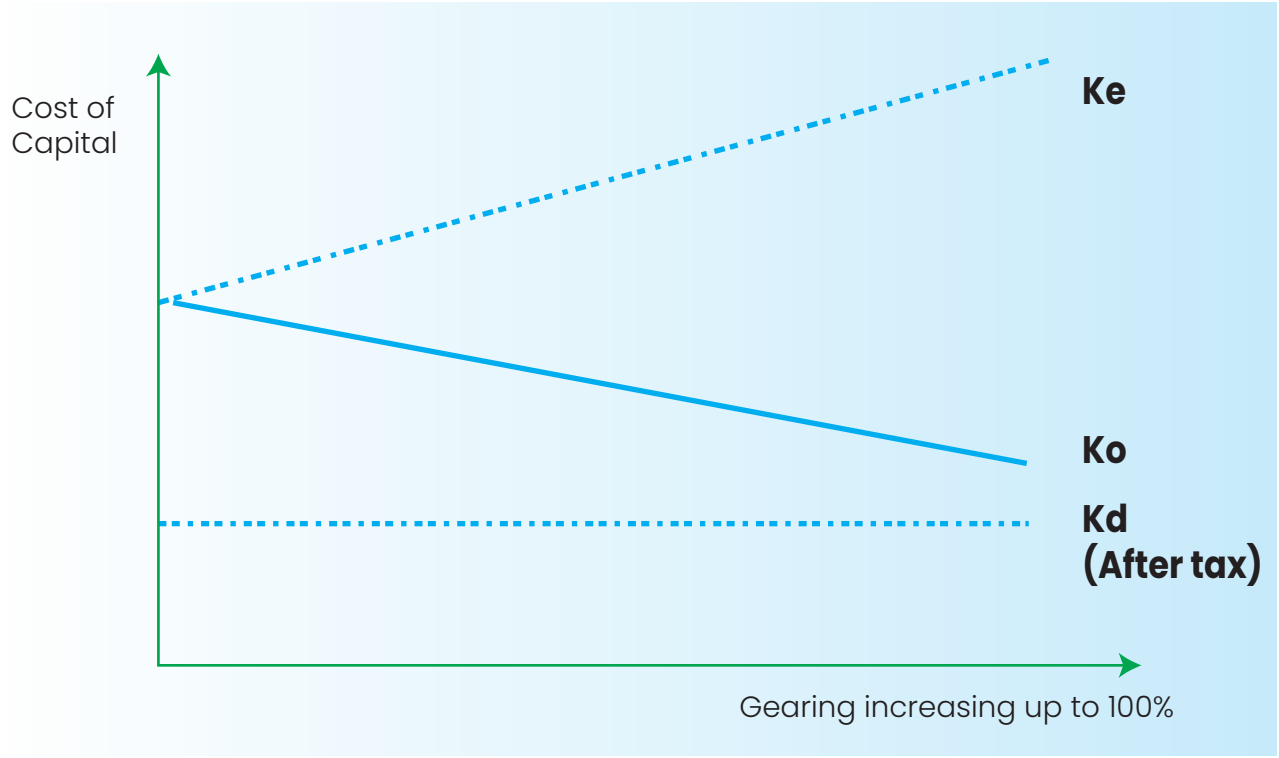

Figure 28: M&M with tax theory

In reality, while the tax benefits of debt are recognised, most firms do not use 100% debt financing due to the increasing costs of financial distress and loss of financial flexibility as leverage increases.

These theories provide a framework for understanding capital structure decisions, but in practice, firms consider many other factors when determining their optimal mix of debt and equity.

4.2.3 Limitations of M&M Theories

- Perfect Market Assumption: M&M theories assume perfect capital markets, which don't exist in reality. This ignores transaction costs, asymmetric information, and market inefficiencies.

- No Bankruptcy Costs: The theories initially ignore the costs of financial distress and bankruptcy, which can be significant in practice.
- Tax Simplification: While later versions consider corporate taxes, they oversimplify the complex tax environments firms operate in, including personal taxes and international tax considerations.
- Information Asymmetry: M&M assumes all market participants have equal information, which is not true in real markets where insider information and signalling effects exist.
- Agency Costs: The theories don't account for conflicts of interest between managers, shareholders, and debtholders, which can influence capital structure decisions.
- Static Model: M&M provides a static view of capital structure, not considering the dynamic nature of business environments and changing financial needs.
- Constant Cost of Debt: M&M assumes the cost of debt remains constant regardless of leverage, which is unrealistic as higher leverage typically increases borrowing costs.
- Dividend Irrelevance: The assumption that dividend policy doesn't affect firm value is contested in practice.
- No Transaction Costs: In reality, issuing and retiring securities involve significant costs, which can influence capital structure decisions.
- Access to Financing: M&M assumes all firms have equal access to debt and equity markets, which is not true, especially for smaller or riskier firms.

These limitations highlight that while M&M theories provide valuable insights, they should be applied with caution and in conjunction with other financial theories and real-world considerations.

4.2.4 Project specific Cost of Equity

One application of traditional theory and M&M theories is that we can use them to calculate WACC which becomes the cost of equity for a project. However, we assume that the risk does not change due to the business starting a new project. A business can change risk by venturing into a project that increases the financial risk or business risk. In such cases, we need to calculate a project specific cost of capital. We, saw earlier in the calculation of CAPM that Beta is a measure of risk. To adjust for the risk, we need to recalculate the beta.

Equity beta

This is the beta we discussed and used in our CAPM calculations. This reflects the business risk and financial risk (risk of a company using debt in their business). If a business does now have debt, then the business would only have business risk, which can also be called ungeared beta.

Asset(ungeared) beta

This reflects the business risk only without the financial risk. This would be the beta for a company with no debt.

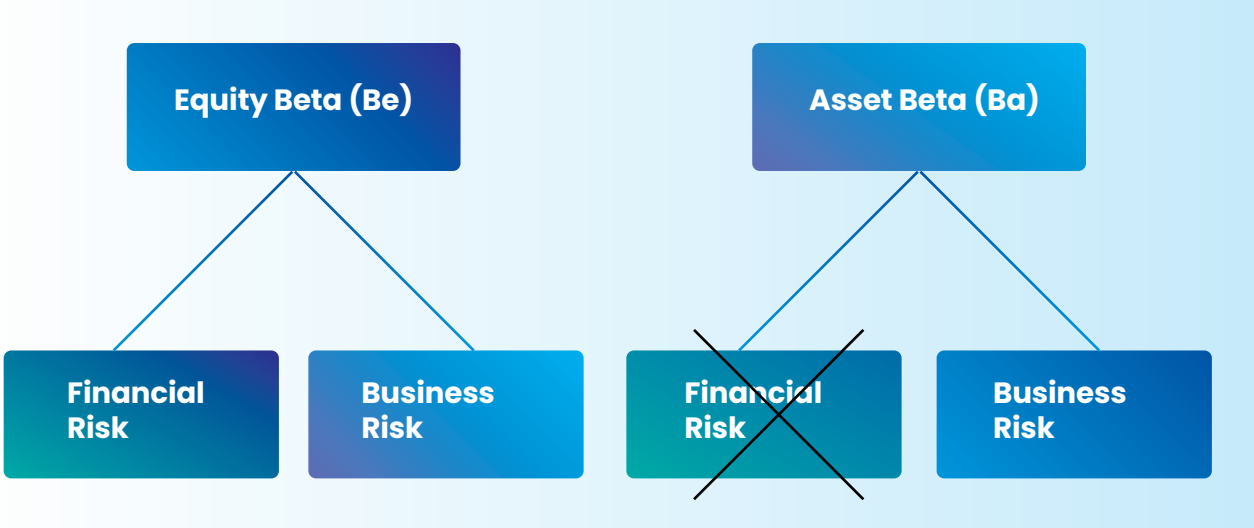

Figure 29: Relationship between Equity Beta and Asset Beta

formulae	$B_a = \left(\frac{V_e}{V_e + V_d(1-T)}\right) K_e + \left(\frac{V_d(1-T)}{V_e + V_d(1-T)}\right) B_d$
	Where V_e is the total market value (ex - div) of share i.e. market capitalisation *V_d is the total market value (ex - interest) of debt* *K_e is the cost of equity in a general company* *K_d is the cost of debt*

Project specific cost of equity

Now that we know the relationship between the betas, if we know that a company is going to start a project that changes the business risk i.e., they have started a project in a new business area, we cannot use their current WACC since this reflects the current business risk which has now changed. We would need to adjust the beta to a project specific one that reflects the business risk of the new project. However, since the business does not have any experience in this new business area, we do not have a beta for this company in the business area. Therefore, we would need to find a proxy company in the new business area, remove their financial risk from the beta and we get a beta that reflects their business risk in this new business area(industry), we can then adjust this for our company's gearing to get business risk and financial risk in the new business area.

The steps we need to follow are;

1. Find the equity beta of a company in the new business area, this reflects its business risk and financial risk.
2. Remove the financial risk (de-gear it) to get the ungeared beta (asset beta). This would be the beat for a company in this industry without any debt.
3. Adjust the business risk with our own gearing (re-gearing it). This reflects the company Equity Beta in the new industry.

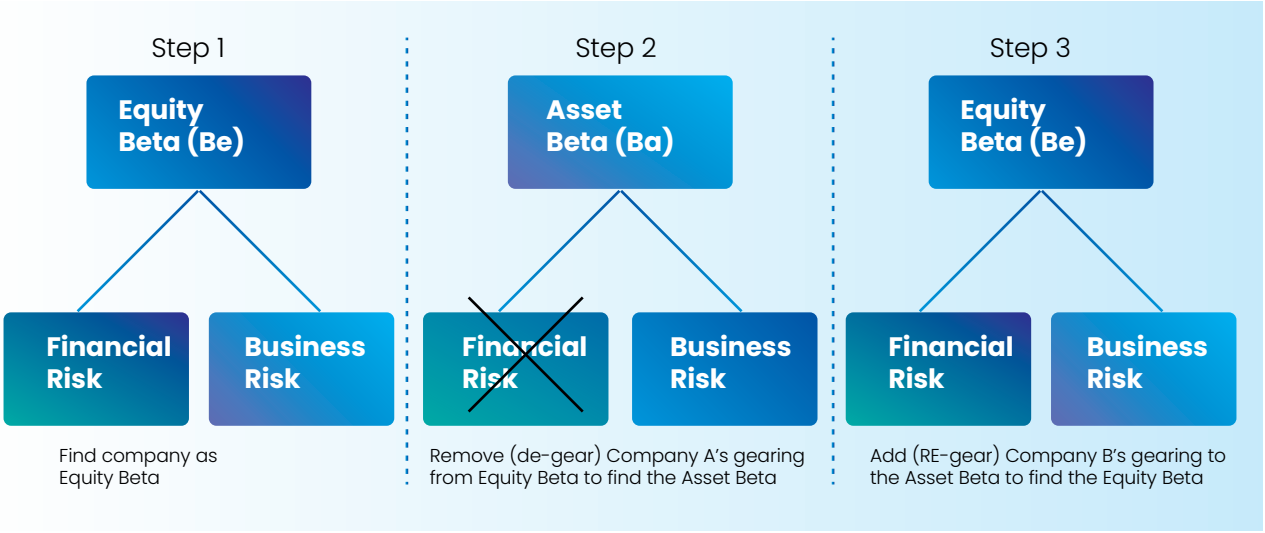

Figure 30: De-gearing and regearing of betas

Let's say we have Company A with the following:

Equity Beta = 1.5	Debt/Equity Ratio = 0.4	Tax Rate = 30%

Step 1: De-gear the beta

Asset Beta = 1.5 / [1 + (1 - 0.30) × 0.4] = 1.5 / 1.28 = 1.17

Now, let's re-gear this asset beta for Company B, which has a different capital structure:

Equity Beta = ???	Debt/Equity Ratio = 0.6	Tax Rate = 30%

Step 2: Re-gear the beta

New Equity Beta = 1.17 × [1 + (1 - 0.30) × 0.6]

= 1.17 × 1.42

= 1.66

We can now use 1.66 in our CAPM calculation to get Ke.

This process allows us to compare the betas of companies with different capital structures on an equal footing, or to adjust a company's beta for a new capital structure.

It's particularly useful in:

- Mergers and acquisitions analysis
- Comparing companies across different industries
- Estimating beta for private companies
- Adjusting beta for changes in a company's capital structure
- Project-specific cost of capital calculations

Remember, this method assumes that the underlying business risk (asset beta) remains constant and that changes in equity beta are solely due to changes in financial leverage. In reality, other factors may also influence beta, so this should be used as part of a broader analysis.

4.3 Other factors that affect financial decisions

Having considered factors that go into capital decisions for businesses, let's look at factors that are important considerations for businesses and individuals when deciding how to fund their activities or investments.

Amount	The amount of financing needed greatly impacts the choice. Larger amounts may require a combination of financing types or limit options to those capable of providing substantial funds (e.g., bank loans, equity financing).
Duration	The timeframe for which financing is needed affects the choice: • Short-term needs might be met with overdrafts or short-term loans • Long-term needs could be addressed through long-term loans, bonds, or equity financing.
Access to finance	A business's ability to access different financing options depends on factors like: • Credit history. • Business size and age. • Relationships with financial institutions. • Market conditions.
Gearing levels	The current debt-to-equity ratio (gearing) of a business influences financing choices: • High gearing may make it difficult to obtain more debt financing. • Low gearing might make debt financing more attractive.

Industry	Different industries have varying risk profiles and capital requirements, which affect financing options: • High-risk industries might rely more on equity financing. • Capital-intensive industries may need long-term financing options.
Security	The assets a business can offer as collateral impact financing choices: • Tangible assets may make secured loans more accessible • Lack of collateral might necessitate unsecured loans or equity financing
Type of organisation	The legal structure of the business affects financing options: • Public companies can access public equity markets • Private companies might rely more on private equity or debt financing
Cost	The cost of different financing options, including interest rates and fees, is a crucial factor: • Lower-cost options are generally preferable but may come with other trade-offs.
Tax saving on profits	The tax implications of different financing methods can influence the choice: • Interest on debt is often tax-deductible, making debt financing attractive. • Equity financing doesn't offer tax benefits but doesn't require repayment.
Speed of obtaining finance	The urgency of the financing need affects the choice: • Bank overdrafts or lines of credit can provide quick access to funds. • Equity financing or complex loan arrangements may take longer to arrange.
Future plans	A business's growth plans and future financial needs influence financing choices: • Plans for rapid expansion might favour equity financing for its flexibility. • Stable businesses might prefer debt financing for its lower cost and tax benefits.

4.4 Gearing

4.4.1 Operational gearing

Operational gearing, also known as operating leverage, measures a company's fixed costs relative to its variable costs. It reflects how changes in sales impact operating profit. High operational gearing indicates a larger proportion of fixed costs, leading to greater profit volatility as sales fluctuate. Companies with high operational gearing experience more significant profit increases when sales rise, but also face higher risks during sales downturns.

formulae	$\text{Operational gearing} = \dfrac{\text{Contribution}}{\text{Profit before interest and Tax (BPIT)}}$
	Where contribution = sales less variable cost of sales.

4.4.2 Financial gearing

Financial gearing, also called financial leverage, refers to the extent a company uses fixed-cost financing, primarily debt, in its capital structure. It measures the relationship between a firm's debt and equity. Higher financial gearing indicates more debt relative to equity, potentially increasing returns for shareholders but also elevating financial risk. It affects a company's financial flexibility, cost of capital, and vulnerability to economic downturns.

formulae	$\text{Financial gearing} = \dfrac{\text{Debt}}{\text{Equity}}$ or $\dfrac{\text{Total debt}}{\text{Total Debt + Equity}}$

A high level of gearing means that there is a high ratio of debt to equity. This means that the company carries high interest charges which reduces the amount available to shareholders since they are paid last after all the other providers of finance have been paid. Therefore, shareholders will carry a higher level of risk than in a company with lower gearing.

Unit D Key terms

Asset Beta D5
Beta D5
Bonds D3
Capital Markets D1
Commercial paper D2
Convertible debt D5
Cost of equity D5
Covenants D3
Debentures D3
Donations D4
Equity Beta D5
Gearing D5
Growth D5
Invoice discounting D2
IPO D3
irredeemable debt D5
Loan notes D3
M&M with tax D5
Money Markets D1
Overdraft D2
Placing D3

redeemable debt D5
Rights Issue D3
Securities D1
Systematic risk D5
Taxes D4
TERPS D3
Treasury bonds D4
Unsystematic risk D5
WACC D5

Summary of Unit D and key learning outcomes

Learning Outcomes	Summary
Financial Markets In this unit, we have explored the diverse landscape of financial markets and financing options available to businesses. We began by examining the structure of financial markets, distinguishing between money markets for short-term instruments and capital markets for long-term securities. This foundation helped us understand the context in which various financing options operate.	
Short term finance	We then delved into short-term finance, discussing tools such as overdrafts, commercial paper, and invoice discounting. These options provide businesses with flexibility to manage working capital and short-term cash flow needs.
Long term finance	The unit progressed to long-term finance, covering a range of instruments including loan notes, bonds, and debentures. We explored newer forms of financing like crowdfunding and peer-to-peer loans, discussing their growing importance in the modern financial landscape. The concept of covenants was introduced, highlighting their role in protecting lenders' interests. Finally, we examined equity finance, focusing on methods for raising capital through share issuance. We discussed Initial Public Offerings (IPOs), placings, rights issues, and Tail End Rights Price Subscribe (TERPS), analysing their mechanics and implications for both companies and investors. Throughout the unit, we emphasised the importance of matching financing methods to business needs and market conditions, providing a comprehensive overview of the tools available for financial managers in both short-term and long-term capital allocation decisions.
Public Sector Funding	We also examined public sector funding sources. We explored the use of treasury bonds as a long-term financing tool, discussed the role of various taxes in generating revenue, and considered the impact of donations in supplementing public sector resources.

Learning Outcomes	Summary
Cost of capital	we have explored the concept of cost of capital and its various components. We began by examining the risk-return relationship, discussing systematic and unsystematic risks, and introducing beta factors as a measure of market risk. We then delved into models for estimating the cost of equity, focusing on the Dividend Growth Model (DGM) and the Capital Asset Pricing Model (CAPM). We analysed their assumptions, applications, and limitations. The unit also covered the cost of debt, exploring different types of debt instruments and their tax implications. Finally, we introduced the Weighted Average Cost of Capital (WACC) as a comprehensive measure of a company's overall cost of capital, integrating both equity and debt components. WACC is crucial for financial managers as it serves as a hurdle rate for investment decisions and aids in optimising capital structure.
Capital structure and gearing	And finally, we have examined the crucial topic of capital structure and gearing. While we touched on the Traditional Theory, our focus was primarily on Modigliani and Miller (M&M) Theories. We explored M&M propositions both without and with tax considerations, analysing how these theories revolutionised our understanding of capital structure's impact on firm value. The unit also covered other factors influencing financial decisions, providing a holistic view of capital structure choices. We concluded by discussing gearing, distinguishing between operational and financial gearing, and their implications for risk and return. Throughout, we emphasised the practical applications of these theories in real-world financial decision-making.

Quiz questions

1. Which type of short-term finance is most suitable for a large, creditworthy corporation looking to raise substantial funds quickly?

   A) Overdraft

   B) Short-term bank loan

   C) Commercial paper

   D) Invoice discounting

2. A small business with seasonal fluctuations in cash flow would likely benefit most from which of the following short-term financing options?

   A) Commercial paper

   B) Overdraft

   C) Invoice discounting

   D) Short-term bank loan

3. Which of the following types of long-term finance typically do not require repayment? (Select all that apply)

   A) Ordinary share capital

   B) Long-term bank loan

   C) Grants

   D) Bonds

   E) Crowdfunding (donation-based)

   F) Preference share capital

   G) Peer-to-peer loans

4. For a small, innovative startup in the clean energy sector looking to raise capital while maintaining control and potentially accessing expertise, which of the following financing options might be most suitable? (Select all that apply)

   A) Convertible debentures

   B) Long-term bank loan

   C) Crowdfunding (equity-based)

   D) Grants

   E) Ordinary share capital

   F) Bonds

G) Peer-to-peer loans

5. Select all the statements that are true regarding finance for public sector organisations:

   A). Treasury bonds are only issued by local governments.

   B). Taxes are a primary source of finance for public sector organisations at all levels of government.

   C). Public-Private Partnerships (PPPs) are never used to finance public sector projects.

   D). Intergovernmental transfers involve funds moving between different levels of government.

   E). Donations are typically the largest source of funding for most public sector organisations.

   F). User fees and charges cannot be implemented by public sector organisations.

   G). Municipal bonds are issued by national governments to fund local projects.

6. Which of the following statements best describes the relationship between portfolio diversification and systematic risk, as illustrated by the systematic risk graph?

   A) Increasing diversification eliminates both systematic and unsystematic risk.

   B) Diversification reduces unsystematic risk but cannot eliminate systematic risk.

   C) Systematic risk increases as more assets are added to a portfolio.

   D) Beta has no impact on the level of systematic risk in a diversified portfolio.

7. Rank the following sources of finance in order from lowest risk to highest risk for the company:

   1. Retained earnings.

   2. Bank loan.

   3. Ordinary shares (common shares).

   4. Preference shares (preference shares).

   5. Corporate bonds (debt).

8. In the Capital Asset Pricing Model (CAPM), if a stock has a beta of 1.5, the risk-free rate is 3%, and the expected market return is 10%, what is the expected return of the share?

   A) 8.5%

   B) 10.5%

   C) 13.5%

D) 15.5%

E) 18%

9. Which of the following statements correctly describes a key difference between the Modigliani and Miller (M&M) theory and the traditional theory of capital structure?

   A) The M&M theory suggests an optimal capital structure exists, while the traditional theory argues capital structure is irrelevant to firm value.

   B) The traditional theory assumes perfect capital markets, while the M&M theory accounts for market imperfections.

   C) The M&M theory (without taxes) argues that firm value is independent of capital structure, while the traditional theory suggests an optimal debt-to-equity ratio exists.

   D) The traditional theory ignores the tax benefits of debt, while the M&M theory (with taxes) emphasises the importance of tax shields.

   E) The M&M theory focuses on minimizing the weighted average cost of capital (WACC), while the traditional theory argues WACC remains constant regardless of leverage.

10. Company XYZ has an equity beta of 1.4, a debt-to-equity ratio of 0.5, and operates in a country with a corporate tax rate of 25%. If Company XYZ plans to change its capital structure to have a debt-to-equity ratio of 0.7, what would be its new equity beta (assuming the business risk remains constant)?

    A) 1.54

    B) 1.62

    C) 1.26

    D) 1.48

    E) 1.35

11. Which of the following statements are true about operational gearing (operating leverage)? (Select all that apply)

    A) Companies with high operational gearing have mostly variable costs.

    B) High operational gearing can lead to significant profit increases with a small rise in sales.

    C) Low operational gearing results in more stable profits across varying sales levels.

    D) A company with high operational gearing is less sensitive to changes in sales.

    E) Operational gearing measures the proportion of fixed costs relative to variable costs.

12. Company XYZ has the following financial information:

Sales: FRW1,000,000	Variable Costs: FRW600,000	Fixed Costs: FRW300,000

Calculate the operational gearing for Company XYZ.

Unit D References and further reading

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Unit E: Working capital management

Learning outcomes

E.1. Introduction to working capital

E.2. Inventory management

E.3. Receivables and payables management

E.4. Cash management

E.5. Cashflow forecasts

Introduction to Unit E

In this unit, we examine the critical area of working capital management, a fundamental aspect of financial operations for any organisation. We begin by introducing the concept of working capital and its significance in maintaining a company's day-to-day operations. We then move on to inventory management, exploring strategies to optimise stock levels and minimise associated costs.

We will examine the intricacies of receivables and payables management, focusing on techniques to enhance cash flow through effective credit policies and supplier relationships. Cash management takes centre stage as we discuss methods to ensure liquidity and maximise returns on idle funds. Finally, we explore the art of cash flow forecasting, a vital tool for anticipating financial needs and making informed business decisions. By mastering these elements of working capital management, you'll be well-equipped to enhance your organisation's financial efficiency and navigate short-term financial challenges with confidence.

E1 Introduction to working capital

Working capital is the difference between a business's current assets and its current liabilities. Working capital is current assets minus current liabilities. The key components of working capital:

Inventory:	Raw materials, work-in-progress, and finished goods held by a company. Represents products available for sale or use in production.
Receivables:	Money owed to the company by customers for goods or services provided on credit. Also called accounts receivable.
Payables:	Money the company owes to suppliers for goods or services received on credit. Also called accounts payable.
Cash:	Liquid assets including currency and bank balances. Immediately available for use in business operations.

Working capital is calculated as current assets (inventory + receivables + cash) minus current liabilities (payables). It represents a company's short-term financial health and operational efficiency.

1.1 Objectives of working capital

The main objectives of working capital management are profit and liquidity.

Liquidity Objective	Profitability Objective
The objective is concerned about maintaining sufficient liquidity to meet short-term obligations and operational needs.	Profitability aims to maximise profits by efficiently using working capital and minimising associated costs.
Example: A manufacturing company aims to keep enough cash on hand to cover 3 months of operating expenses, including payroll, raw material purchases, and utility bills. This ensures they can continue operations smoothly even if there are temporary disruptions in cash inflows.	**Example:** A retail store implements a just-in-time inventory system to reduce storage costs and minimise capital tied up in excess stock. By optimising inventory levels, they **free up cash** that can be invested in high-return marketing campaigns or used to negotiate early payment discounts with suppliers, thereby increasing overall profitability.

These objectives often involve trade-offs. For instance, holding more cash improves liquidity but may reduce profitability as that money isn't being invested in potentially higher-yielding activities. The key is finding the right balance that suits the company's specific needs and risk tolerance.

1.2 Profitability vs Liquidity

A business must carefully balance profitability and liquidity to ensure long-term success. Insufficient working capital can lead to operational difficulties and reduced profits, as the company may struggle to meet short-term obligations or capitalise on growth opportunities. Conversely, excessive working capital, particularly in the form of inventory and receivables, can tie up resources and decrease efficiency. This inefficiency can result in missed investment opportunities and, ultimately, lower profits. The key is to maintain optimal levels of working capital that support smooth operations whilst maximising return on assets.

As financial managers, we play a big role in making sure that there is a balance between the two. We looked in other units, at how important it is to be able to balance the three key decisions: investment decision, dividend decision and financing decision. Working capital management plays a very big role in this and we need to ensure we have a careful balance. This is the main emphasis of the unit.

1.3 Balancing Working Capital needs

1.3.1 Aggressive policy

An aggressive approach to working capital management prioritises profitability over liquidity. Here are the key characteristics and implications of this strategy:

Low Cash Reserves:	Maintains minimal cash balances. Invests excess cash in operations or high-yield opportunities.
Lean Inventory:	Keeps inventory levels low. Uses just-in-time systems to minimise storage costs.
Tight Credit Policy:	Offers limited credit to customers. Aggressively collects receivables.
Extended Payables:	Delays payments to suppliers as long as possible. Negotiates longer payment terms.
Industry Considerations:	More suitable for stable industries with predictable cash flows. Less appropriate for seasonal or highly volatile businesses.

Example:

A technology company adopts an aggressive approach by investing heavily in R&D and new product development, keeping minimal cash reserves. They negotiate 90-day payment terms with suppliers but require customers to pay within 30 days. This approach maximises capital available for growth but increases the risk of cash flow problems if sales decline unexpectedly.

An aggressive approach can boost profitability but requires skilled management and robust financial planning to mitigate the increased risks.

1.3.2 Conservative policy

A conservative policy in working capital management takes the opposite approach to an aggressive policy, prioritising liquidity and risk reduction over maximising profitability. Here are the key features of a conservative working capital policy:

High Cash Reserves:	Maintains substantial cash balances. Invests in liquid, low-risk securities.
Larger Inventory Levels:	Keeps higher stock levels to avoid stockouts. Prioritises meeting customer demand over minimising inventory costs.
Lenient Credit Policy:	Offers more generous credit terms to customers. May result in higher accounts receivable.
Prompt Payment of Payables:	Pays suppliers quickly, often before due dates. May take advantage of early payment discounts.

Example:

A seasonal retail business adopts a conservative approach by maintaining a cash reserve equal to six months of operating expenses. They stock up on inventory well in advance of peak seasons and offer 60-day payment terms to reliable customers. While this approach reduces their return on assets, it ensures they can weather slow periods and unexpected market disruptions without financial stress.

This conservative strategy sacrifices some profitability for increased financial stability and reduced risk. It's particularly beneficial for businesses operating in uncertain environments or those prioritising long-term sustainability over short-term gains.

1.4 Working Capital Cycle

The Working Capital Cycle, also known as the Cash Conversion Cycle, refers to the time it takes for a company to convert its investments in inventory and other resources into cash flows from sales. This cycle is an important measure of a company's operational efficiency and short-term liquidity.

The Working Capital Cycle typically consists of three main components:

- Days Inventory Outstanding (DIO): The average number of days it takes to sell inventory.
- Days Receivables Outstanding (DRO): The average number of days it takes to collect payment after a sale is made.
- Days Payables Outstanding (DPO): The average number of days the company takes to pay its suppliers.

The formula for calculating the Working Capital Cycle is:

Working Capital Cycle = DIO + DRO - DPO

A shorter cycle indicates that a company can more quickly turn its working capital into cash, which is generally seen as positive. It means the company is efficient in managing its inventory, collecting payments, and paying its bills.

A longer cycle might suggest that a company is taking too long to collect payments or is holding too much inventory. However, in some industries, a longer cycle might be normal or even necessary.

Understanding and managing the Working Capital Cycle is crucial for businesses as it directly impacts cash flow, liquidity, and overall financial health. Companies often strive to optimise this cycle to improve their operational efficiency and free up cash for other purposes.

1.4.1 Working capital ratios

formulae	$\text{Inventory holding period} = \frac{\text{Finished goods}}{\text{Cost of Sales}}$
	$\text{Inventory turnover} = \frac{\text{Finished goods}}{\text{Cost of Sales}}$
	$\text{Accounts receivable collection period} = \frac{\text{Receivables}}{\text{Credit Sales}} \times 365$
	$\text{Accounts payables payment period} = \frac{\text{Payables}}{\text{Credit Purchases}} \times 365$

1.4.2 Cash Operating Cycle

The cash operating cycle, also known as the working capital cycle, is a crucial tool for analysing how sales impact liquidity. This cycle encompasses the timeframe from purchasing inventory to receiving payment from customers. It includes several key stages: acquiring inventory, selling it, paying suppliers, and collecting payment from customers.

Consider this example: A company buys inventory on credit with 40-day payment terms. It takes 30 days to sell the inventory, and customers are given 30 days to pay. In this scenario, the company faces a 20-day cash gap—the period between paying suppliers and receiving payment from customers. This gap highlights the importance of effective working capital management to maintain sufficient liquidity.

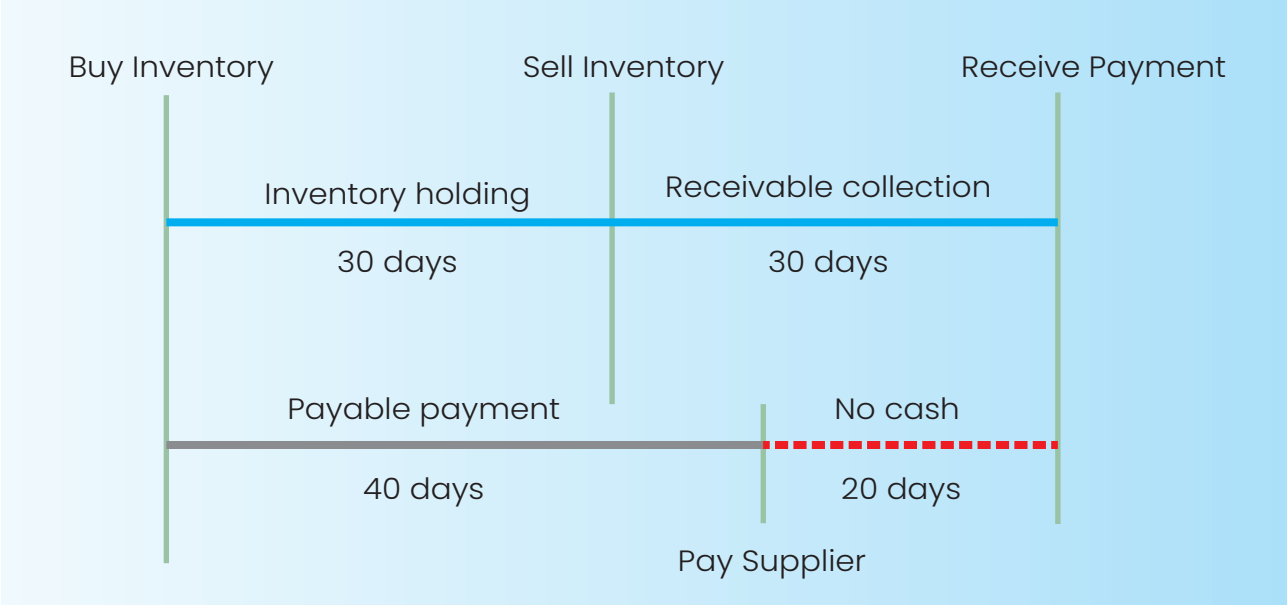


Figure 31: Illustration of Cash Operating Cycle

formulae	Cash Operating Cycle = Cash to be received (in days) ***minus*** Cash to be paid out (in days)

Working Capital Cycle Worked Example: XYZ Manufacturing

Let's calculate the Working Capital Cycle for XYZ Manufacturing using the following data:

Given Information:

Annual revenue: FRW10,000,000	Average Inventory: FRW1,500,000	Average Payables: FRW500,000
Cost of sales (COS): FRW6,000,000	Average Receivables: FRW800,000	Days in year: 365

Step 1: Calculate Inventory holding period

Inventory holding period = (Average Inventory / COS) × 365

Inventory holding period = (FRW1,500,000 / FRW6,000,000) × 365 = 91.25 days

Step 2: Calculate Accounts receivable collection period

Accounts receivable collection period = (Average Accounts Receivable / Annual Revenue) × 365

Accounts receivable collection period = (FRW800,000 / FRW10,000,000) × 365 = 29.2 days

Step 3: Calculate Accounts payable payment period

Accounts payable payment period = (Average Accounts Payable / COGS) × 365

Accounts payable payment period = (FRW500,000 / FRW6,000,000) × 365 = 30.42 days

Step 4: Calculate Working Capital Cycle/Cash Operating Cycle

Working Capital Cycle = Cash to be received (in days) minus Cash to be paid out (in days)

Working Capital Cycle = 91.25 + 29.2 - 30.42 = 90.03 days

Interpretation:

XYZ Manufacturing's Working Capital Cycle is approximately 90 days. This means it takes the company about 90 days to convert its investments in inventory and other resources into cash flows from sales.

- It takes about 91 days to sell inventory.
- It takes about 29 days to collect payment after a sale.
- The company pays its suppliers in about 30 days.
- This means we need some cash to cover the 90 days, or we need to consider getting an overdraft or some sort of finance.

To improve its Working Capital Cycle, XYZ Manufacturing could consider:

- Reducing inventory levels.
- Collecting payments from customers faster.
- Negotiating longer payment terms with suppliers.

1.5 Overtrading

Overtrading in working capital management refers to a situation where a company expands its operations and sales too rapidly without having adequate working capital to support this growth. This can lead to cash flow problems and financial distress. Overtrading occurs when;

- A business grows sales faster than its ability to finance the additional working capital required.
- The company takes on more orders or projects than it can efficiently handle with its current resources.

This will give rise to several issues for the business which include;

- Cash flow shortages
- Inability to pay suppliers on time
- Difficulty meeting short-term debt obligations
- Reduced profit margins due to inefficiencies
- Potential loss of customers due to inability to fulfil orders

1.5.1 Signs of Overtrading

There are signs that normally indicate when a company is overtrading, these signs include;

Declining liquidity ratios:	Decreasing current ratio. Falling quick ratio.
Stretched payables:	Longer payable days. Difficulty paying suppliers on time.
Inventory issues:	Increasing inventory turnover. Stock shortages.
Cash flow problems:	Negative operating cash flow despite profit on paper. Frequent use of overdraft facilities.
Financing patterns:	Increased reliance on short-term debt. Using customer deposits to fund operations.
Operational strains:	Quality issues or increased customer complaints. Difficulty meeting delivery deadlines.
Financial indicators:	Declining profit margins. Rapid sales growth outpacing working capital growth.
Banking relationships:	Exceeding credit limits frequently. Difficulty obtaining additional financing.
Staff-related issues:	High employee turnover. Excessive overtime.
Management behaviour:	Constantly chasing new sales without addressing internal issues. Reluctance to turn down any business opportunity.

1.5.2 Overcapitalisation

Overcapitalisation in relation to working capital occurs when a company holds excessive current assets compared to its operational needs. This arises when a business maintains higher levels of cash, stock, or debtors than necessary to support its daily operations and short-term obligations.

While sufficient working capital is crucial for liquidity, overcapitalisation can lead to inefficient resource use. Excess cash may earn low returns, surplus stock can increase storage costs and risk obsolescence, and excessive debtors may indicate poor collection practices.

Overcapitalisation can negatively impact a company's profitability and return on investment. It ties up funds that could be used for more productive purposes, such as expansion or debt reduction. It may also signal to investors that the company lacks growth opportunities or is inefficient in resource management.

To address overcapitalisation, businesses can optimise stock management, improve debtor collection, and invest excess cash in short-term, liquid investments.

E2 Inventory management

2.1 Inventory Management

For businesses that do not use just in time (JIT) inventory management systems, there is an optimum order quantity for inventory items, known as the EOQ.

The aim of the EOQ model is to minimise the total cost of holding and ordering inventory. To do this, it is necessary to balance the relevant costs. These are:

- the variable costs of holding the inventory (holding costs)
- the fixed costs of placing the order (ordering costs)

2.2 Ordering Costs vs Holding Costs

The cost of ordering inventory

The model assumes that it costs a certain amount to hold a unit of inventory for a year (referred to as CH in the formula below). Therefore, as the average level of inventory increases, so too will the total annual holding costs incurred.

Examples of ordering costs include;

- Administrative expenses for placing orders
- Shipping and handling
- Inspection and quality control costs

The cost of holding inventory

The model assumes that a fixed cost is incurred every time an order is placed (referred to as CO in the formula below). Therefore, as the order quantity increases, there is a fall in the number of orders required, which reduces the total ordering cost.

Examples of holding costs include;

- Storage space
- Insurance
- Deterioration and obsolescence
- Opportunity cost of invested capital

Balance between holding costs and ordering costs

Because you are trying to balance these two costs (one which increases as re-order quantity increases and one which falls), total costs will always be minimised at the point where the total holding costs equals the total ordering costs. This point will be the economic order quantity (EOQ).

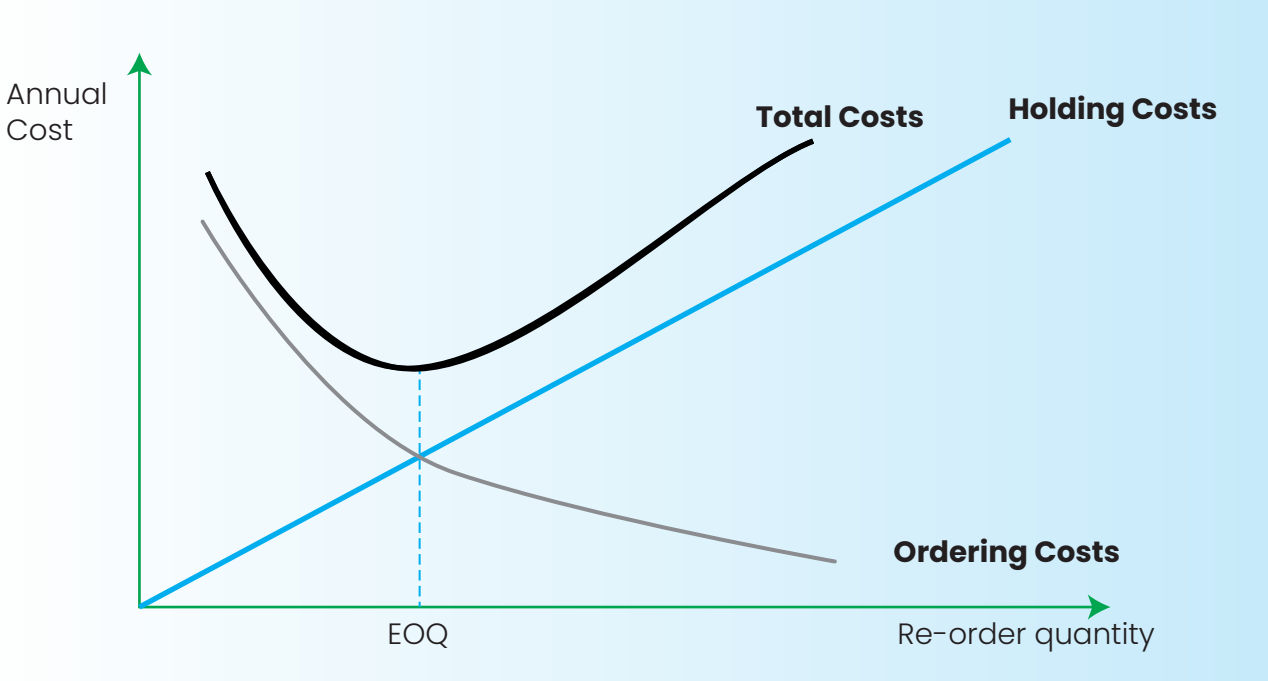


Figure 32: A graphical illustration of EOQ

Worked Example

Let's assume Company RW has the following ordering and holding costs;

- Holding costs **($C_{H)}$**= FRW20 per unit.
- Ordering costs **(C_o)**= FRW30 per order.
- Annual Demand = **12,000**
- Unit Purchase Price = **FRW0.10** per unit

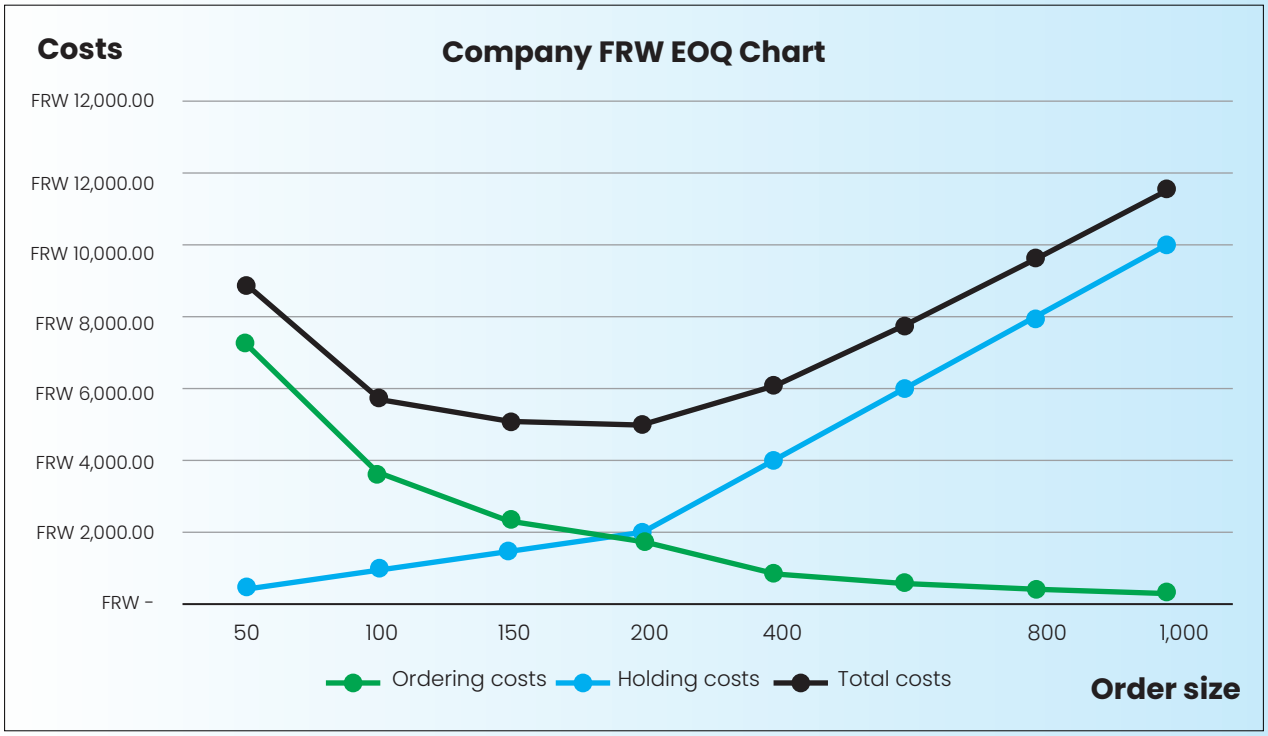
To calculate total ordering cost (depends on the number of orders) we would need to calculate the number of orders and multiply that by the cost per order, i.e., **Ordering costs (C_o) x Annual Demand/Order size.**

To calculate total holding cost, we assume that half of the order size is kept in stock, so we divide the order size by two and multiply by the holding cost per unit i.e. **Order size/2 x Holding costs (C_H).**

Using the formulas above ordering costs and holding costs would change depending on the order size as per table below;

Cost per order	**FRW 30.00**	**Holding Costs**	**FRW 20.00**	**Purchase Price**	**FRW**	**0.10**
Annual Demand			**12000.00**			
Order Quantity	Number of orders	Ordering costs	Holding Costs	Ordering plus Holding Costs Total	Purchase Price	Total Costs
50	240	FRW 7,200.00	FRW 500.00	FRW 7,700.00	FRW 1,200.00	FRW 8,900.00
100	120	FRW 3,600.00	FRW 1,000.00	FRW 4,500.00	FRW 1,200.00	FRW 5,800.00
150	**80**	**FRW 2,400.00**	**FRW 1,500.00**	**FRW 3,900.00**	**FRW 1,200.00**	**FRW 5,100.00**
200	**60**	**FRW 1,800.00**	**FRW 2,000.00**	**FRW 3,800.00**	**FRW 1,200.00**	**FRW 5,000.00**
400	**30**	**FRW 900.00**	**FRW 4,000.00**	**FRW 4,900.00**	**FRW 1,200.00**	**FRW 6,100.00**
600	20	FRW 600.00	FRW 6,000.00	FRW 6,600.00	FRW 1,200.00	FRW 7,800.00
800	15	FRW 450.00	FRW 8,000.00	FRW 8,450.00	FRW 1,200.00	FRW 9,650.00
1000	12	FRW 360.00	FRW 10,000.00	FRW 10,360.00	FRW 1,200.00	FRW 11,560.00

Plotting this on a graph we can clearly see how the ordering costs decrease as the order size increases and the cost of holding increases as the order size increases. However, total costs decrease to an optimal point and then start increasing again, this is the EOQ.



2.2.3 EOQ

The primary goal of the EOQ model is to minimise the total cost of inventory management by finding the sweet spot between holding costs and ordering costs (shown in the diagram above).

formulae	$EOQ \sqrt{\frac{2C_OD}{C_H}}$
	Where: C_O = *Cost per order* D = *Annual demand* C_H = *Cost of holding one unit for one year.*

So, the EOQ for Company RW will be EOQ = $\sqrt{\frac{2C_OD}{C_H}} = \sqrt{\frac{2 \times FRW\ 30 \times 12{,}000}{20}}$ = 190 units

Implementing EOQ

To effectively implement EOQ the business would need to;

- Accurately calculate holding and ordering costs.
- Regularly update demand forecasts.
- Monitor and adjust for changes in lead times.
- Consider using inventory management software for more complex scenarios.

Quantity discounts

Discounts may be offered for ordering in large quantities. If the EOQ is smaller than the order size needed for a discount, companies must calculate if the order size should be increased above the EOQ.

The total inventory cost for the annual level of demand (including holding costs, ordering costs and purchase costs) should be compared:

- assuming the EOQ is used
- assuming the order size enabling the discount is used

The assumption is that the company would accept the discount and order in the larger quantity if the overall inventory cost is lower.

Benefits and Limitations of the EOQ Model

Benefits	Limitations
• Reduces overall inventory costs. • Improves cash flow by optimising inventory levels. • Minimises the risk of stockouts and overstocking. • Provides a systematic approach to inventory decisions.	• Assumes constant demand and lead times. • May not account for quantity discounts. • Doesn't consider capacity constraints.

2.3 Advanced Inventory Management Methods

2.3.1 Just in Time (JIT) inventory management

Just-in-time (JIT) stock management, pioneered by Toyota in the 1970s, is an inventory strategy aimed at increasing efficiency and reducing waste by receiving goods only as they are needed in the production process. This approach has since been adopted by many companies across various industries. Stock is ordered and received only when it's required for production, not before.

The aim of JIT is to reduce inventory holding costs, minimise waste, increase efficiency and improve cash flow.

Benefits:	Challenges:
• Lower storage costs. • Reduced risk of obsolete inventory. • Less working capital tied up in stock. • Faster response to market changes.	• Requires precise planning and scheduling. • Vulnerable to supply chain disruptions. • Needs strong supplier relationships. • May result in stockouts if not managed properly.

Real world Example

Dell Computers revolutionised the PC industry in the 1990s and early 2000s with their Just-in-Time (JIT) approach. Customers could customise computers online, which Dell then built and shipped individually, eliminating finished product inventory.

Upon receiving an order, Dell would assemble the computer within hours using just-delivered components from nearby suppliers. This JIT model offered several advantages:

- Reduced inventory costs
- Improved cash flow
- Ability to offer the latest technology
- High degree of customisation without inventory risks

Dell's approach significantly reduced costs and increased efficiency, helping the company become a leading PC manufacturer. Their success demonstrated how effective JIT implementation could provide a substantial competitive advantage.

However, as the PC market evolved, Dell has had to adapt its strategy, illustrating the need for flexibility in JIT systems as market conditions change. (Kumar & Craig, 2007)

2.3.2 Using technology to manage inventory

Technology has changed the way things work, and this has made inventory management much more integrated and advanced. Suppliers and customers can integrate their inventory management systems through Electronic Data Interchange (EDI) or API connections. This integration enables real-time data sharing, improving supply chain efficiency.

For instance, a retailer's system can automatically send purchase orders to a supplier when stock levels fall below a predetermined threshold. The supplier's system then processes the order, updates inventory, and schedules shipment.

Upon dispatch, the supplier's system sends an Advanced Shipping Notice (ASN) to the retailer, allowing them to prepare for receipt. When the goods arrive, the retailer's system automatically updates its inventory levels.

This integration reduces manual data entry, minimises errors, speeds up order processing, and enables just-in-time inventory management, ultimately reducing costs and improving customer satisfaction.

Examples of inventory management software includes;

- **SAP Business One:** Integrated business management software with inventory features.
- **inFlow Inventory:** Suitable for small to medium-sized businesses.
- **Oracle NetSuite:** Cloud-based ERP system with strong inventory capabilities.
- **QuickBooks Enterprise:** Comprehensive inventory management for small to medium businesses.

These are some of some popular choices, the best choice depends on your specific business needs, size, and budget.

E3. Receivables and payables management

3.1 Managing Receivables

We saw from the example on cash operating cycle that the longer the receivables period, the longer the cash operating cycle. This means that cash will be tied up for an extended time in receivables. Having a shorter receivables payment period can reduce this cycle, improving a company's liquidity and working capital management.

For example:

If a company has a 45-day receivables period, it takes 45 days on average to collect payment from customers after a sale.

By implementing stricter credit policies or offering early payment discounts, the company might reduce this to 30 days.

This 15-day reduction in the receivables period directly shortens the cash operating cycle, allowing the company to reinvest or use the cash sooner.

3.1.1 Credit Control

Since receivables are quite important to working capital, a company needs to be careful with the credit policies to avoid working capital being held up in receivables. They will need to decide when to offer credit, who to offer it to and for how long they should allow customers to take before paying for their goods. While there are some good benefits to offering credit, this can come with some costs. The table below highlights some main benefits and limitations.

Benefits	Limitations
Increased sales volume: Offering credit can attract more customers, especially those who may not have immediate cash but want to buy on credit. **Competitive advantage:** It can make a company more competitive in the market compared to businesses that only accept cash. **Customer loyalty and retention:** Offering credit terms can lead to stronger relationships with customers, encouraging repeat business.	**Risk of bad debts:** There is always a risk that some customers may not pay their invoices, leading to financial losses. **Increased working capital requirement:** When credit is extended, the cash tied up in receivables increases, which affects liquidity. **Administration costs:** Managing credit accounts, collecting payments, and credit control requires resources and staffing, which increases operational costs. **Opportunity cost:** The capital tied up in receivables could have been used for other investment opportunities.

3.1.2 Settlement Discounts

When evaluating whether to offer early settlement discounts to customers, it's crucial to balance the benefits of improved cash flow and reduced credit risk with the costs of providing the discount. A business needs to calculate and compare the cost of giving discount to the benefits. The main benefit is that they would get the cash early and reduce potential interest paid on loans. This would need to be compared to the amount being offered as a discount. Other costs and benefits include;

Benefits	Costs
Improved Cash Flow: By encouraging customers to pay earlier, the company receives cash faster, reducing the amount of time receivables are outstanding. This allows the business to reinvest the money into operations or pay off its own debts sooner. **Reduced Risk of Bad Debts:** Offering a discount incentivises customers to settle their accounts sooner, which reduces the risk of non-payment or delayed payment. The sooner the company receives cash, the lower the chance of defaults. **Lower Administrative Costs:** Early settlement reduces the need for ongoing credit control and collection efforts, saving time and resources that would otherwise be spent chasing overdue payments. **Competitive Edge:** Some customers may be more inclined to do business with a company that offers early payment incentives, which can lead to increased customer loyalty and potentially higher sales.	**Reduced Revenue:** Offering a discount reduces the total revenue from each sale. If the discount is significant, the impact on profit margins could outweigh the cash flow benefits. **Customer Expectation:** Customers may start expecting discounts as a standard practice. Once a discount is offered, it can be challenging to revert to regular payment terms without alienating customers. **Potential for Cash Flow Disruption:** While early payments improve liquidity, a significant uptake in early settlement discounts could lead to uneven cash flow. If too many customers take advantage of the discount, the business could face liquidity shortages in the future.

3.1.3 Debt Factoring

Debt factoring, also known as accounts receivable financing, is a financial transaction where a business sells its accounts receivable (invoices) to a third party (called a factor) at a discount. This allows the business to receive cash quickly rather than waiting for customers to pay their invoices.

Example

Company ABC has issued an invoice for FRW10,000 to a customer, due in 60 days. ABC needs cash now and doesn't want to wait 60 days. They contact a factoring company.

- The factoring company agrees to buy the invoice at a 5% discount. ABC receives FRW9,500 immediately (FRW10,000 - 5% fee = FRW9,500).

- The factoring company now owns the invoice and will collect the full FRW10,000 from ABC's customer when it's due.
- ABC gets immediate cash flow, albeit slightly less than the full invoice amount. The factoring company makes a FRW500 profit (minus any costs associated with collecting the debt).

This can be beneficial for businesses that need quick cash flow, but it does come at the cost of reduced profit margins. The specific terms and fees can vary depending on the factoring company and the perceived risk of the invoices being factored.

Advantages	Disadvantages
Improved cash flow: Businesses get immediate access to cash, which can help with day-to-day operations and growth.	**Cost:** The fees can be higher than traditional financing methods, reducing profit margins.
Risk transfer: In some arrangements, the factor assumes the risk of non-payment.	**Dependence:** Businesses might become reliant on factoring for cash flow, which can be problematic long-term.
Reduced admin work: The factoring company often takes over credit control and debt collection, saving time and resources.	**Customer relationships**: Having a third party collect debts might affect relationships with customers.
Easier to obtain than traditional loans: Factors focus on the creditworthiness of the business's customers rather than the business itself.	**Contractual obligations:** Some factoring agreements come with long-term commitments or minimum volume requirements.
No debt incurred: Unlike loans, factoring doesn't create new debt on the balance sheet.	**Not suitable for all businesses:** It works best for B2B companies with creditworthy customers and high-volume invoicing.

With Recourse and without Recourse

There are two different types of debt factoring arrangements, which primarily differ in how risk is allocated between the business and the factoring company. Let's break down each type:

With Recourse Factoring:

In this arrangement, the business retains the risk of non-payment by customers. If a customer doesn't pay the invoice, the business must buy back the unpaid invoice or replace it with a collectible one. The business is ultimately responsible for any bad debts. This type usually has lower fees because the factor takes on less risk. It's more common and easier to qualify for.

Example:

Company A factors a FRW10,000 invoice. If the customer doesn't pay after 90 days, Company A must repay the FRW10,000 to the factoring company.

Non-Recourse Factoring:

In this arrangement, the factoring company assumes the risk of non-payment by customers. If a customer doesn't pay due to credit issues or insolvency, the factoring company absorbs the loss. The business is protected against bad debts from customers. This type usually has higher fees to compensate for the increased risk to the factor. It's less common and may have stricter qualification criteria.

Example:

Company B factors a FRW10,000 invoice on a non-recourse basis. If the customer goes bankrupt and can't pay, the factoring company takes the loss, and Company B keeps the money it received.

It's important to note that even in non-recourse factoring, the business may still be liable if non-payment is due to disputes over the quality of goods or services provided, rather than the customer's inability to pay.

The choice between recourse and non-recourse factoring depends on the business's risk tolerance, the creditworthiness of its customers, and the cost-benefit analysis of the fees involved.

3.2 Managing Payables

We understand from the cash operating cycle concept that the longer the payables period, the shorter the cash operating cycle. This means that cash can be retained longer before being paid out to suppliers, effectively providing the company with a form of short-term, interest-free financing.

For example:

If a company has a 30-day payables period, it takes 30 days on average to pay its suppliers after receiving goods or services.

By negotiating better terms with suppliers or optimizing payment schedules, the company might extend this to 45 days.

This 15-day extension in the payables period directly shortens the cash operating cycle, allowing the company to hold onto its cash longer and potentially invest it in short-term opportunities.

A longer payables period can improve a company's working capital position and liquidity. However, it's important to balance this with maintaining good relationships with suppliers and avoiding late payment penalties.

3.2.1 Settlement Discounts

When considering whether to take early payment discounts offered by suppliers, it's important to weigh the benefits of the discount against the costs of early payment. A business needs to calculate and compare the cost of paying early to the value of the

discount received. The main benefit is the discount itself, which effectively reduces the cost of goods or services purchased. This needs to be balanced against the loss of cash flow flexibility from paying earlier than required.

Other costs and benefits to consider include:

Benefits	Costs
Cost savings: The discount directly reduces expenses, improving profitability. **Improved supplier relationships:** Consistent early payments can lead to preferential treatment. **Potential for negotiating better terms:** Demonstrating ability to pay quickly can lead to more favourable future terms. **Avoid late payment penalties:** Ensures payments are always on time.	**Reduced cash flow flexibility:** Paying earlier ties up cash that could be used elsewhere. **Potential need for short-term borrowing:** If cash is tight, the company might need to borrow to take advantage of discounts. **Opportunity cost:** The cash used for early payment might have higher returns if invested elsewhere. **Administrative complexity:** Managing various payment schedules can increase workload.

When deciding whether to take early payment discounts, companies should also consider:

- The implied annual interest rate of the discount
- The company's current cash position and projected cash flows
- The cost of alternative sources of short-term financing
- The strategic importance of the supplier relationship

It's crucial to analyse each discount offer individually, as the benefits may vary depending on the specific terms and the company's financial situation at that time.

E4/ E5. Cash management and Cash Forecasting

4.1 Cash Management

4.1.1 Reasons for holding cash

The three main motives for holding cash, as proposed by economist John Maynard Keynes (1963), are:

Precautionary motive:

This refers to holding cash to meet unexpected expenses or emergencies. People and businesses keep cash on hand to deal with unforeseen circumstances, such as sudden medical expenses, car repairs, or economic downturns. This cash acts as a buffer against uncertainty.

Transaction motive:

This involves holding cash to conduct day-to-day transactions and meet regular financial obligations. Individuals need cash to pay for goods and services, while businesses require it to pay suppliers, employees, and other operational expenses. The transaction motive ensures smooth functioning of regular economic activities.

Speculative motive:

This refers to holding cash to take advantage of potential investment opportunities or favourable market conditions. People may keep cash readily available to invest in stocks, bonds, or other assets when they believe prices are attractive. This motive is influenced by expectations about future interest rates and asset prices.

Each of these motives contributes to the overall demand for money in an economy. The balance between these motives can vary depending on economic conditions, individual preferences, and business needs.

4.1.2 Costs of holding cash

While holding cash provides liquidity and financial flexibility, it comes with several associated costs that businesses must consider:

Opportunity Cost:	Perhaps the most significant cost is the foregone returns from alternative investments. Cash typically earns little to no interest, whereas investing in securities or the business itself could yield higher returns.
Inflation Risk:	Cash loses purchasing power over time due to inflation. In periods of high inflation, this erosion can be substantial.
Handling and Transaction Costs:	Managing cash involves costs related to counting, transporting, and depositing, especially for businesses handling large amounts of physical currency.
Taxation:	In some jurisdictions, holding large cash reserves might have tax implications, potentially affecting a company's tax efficiency.
Negative Interest Rates:	In certain economic environments, banks may charge negative interest rates on large cash deposits, effectively charging for holding cash.

Balancing these costs against the benefits of liquidity is crucial for effective cash management.

4.2 The Baumol Model

The Baumol cash model, also known as the Economic Order Quantity (EOQ) model for cash management, was developed by William Baumol in 1952. It treats cash management similarly to inventory management. The model assumes that cash is depleted at a steady rate over time. When cash reaches zero, the firm sells marketable securities to replenish its cash balance. The optimal cash balance is determined by balancing the opportunity cost of holding cash against the transaction costs of converting securities to cash. The optimal cash balance (C*) is calculated using the formula:

formulae	$EOQ \sqrt{\frac{1FT}{R}}$
	Where: *F = Fixed cost per transaction* *T = Total cash needed for the period* *R = Opportunity cost (interest rate)*

Example:

If a company needs FRW100,000 per month, the fixed cost per transaction is FRW50, and the interest rate is 6% per year (0.5% per month):

C* = √ ((2 * FRW50 * FRW100,000) / 0.005) = FRW 14,142

The company should replenish its cash balance to FRW14,142 each time it runs out.

4.2.1 Limitation of the model

The Baumol model has several limitations which include;

- Assumes constant and predictable cash outflows, which is unrealistic for most businesses.
- Ignores cash inflows, focusing only on outflows.
- Assumes instant and costless conversion between cash and marketable securities.
- Doesn't account for safety reserves or minimum cash balances.

4.3 Miller Orr Model

The Miller-Orr model, developed by Merton Miller and Daniel Orr in 1966, is more realistic as it assumes that cash flows are uncertain and fluctuate randomly. The model establishes upper and lower control limits for cash balances.

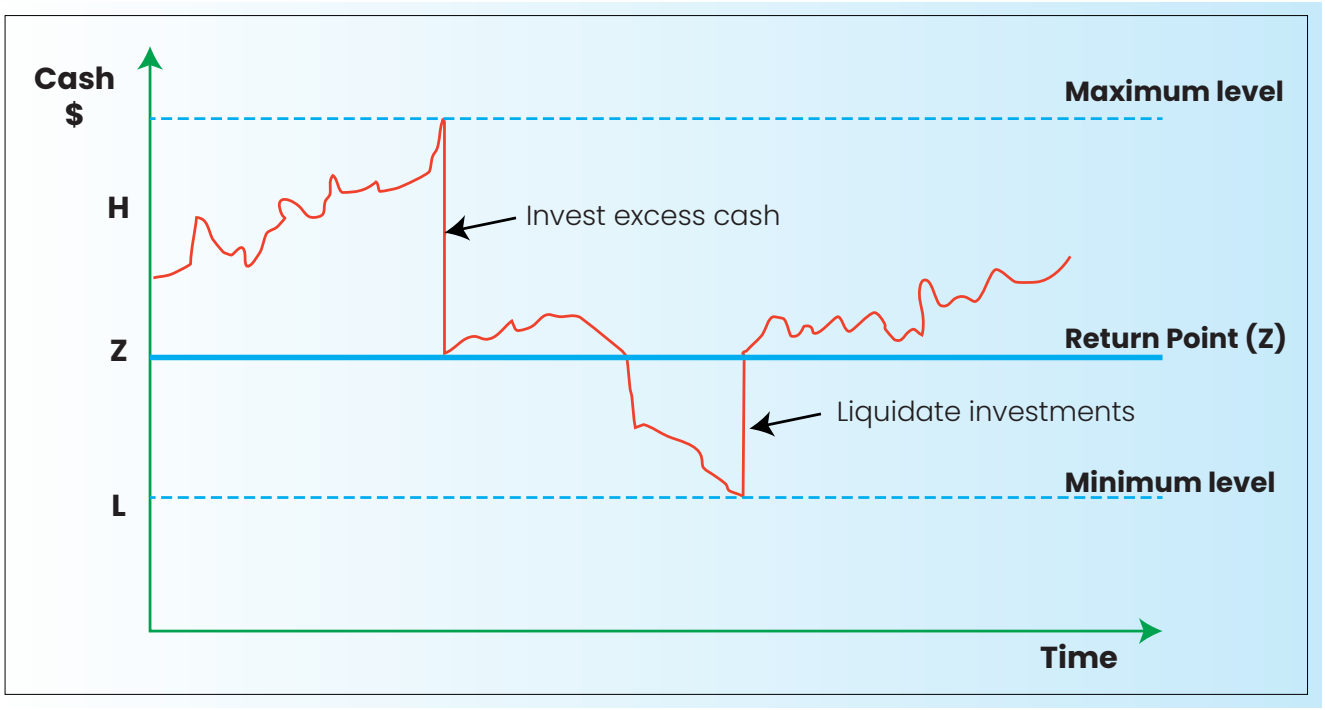


Figure 33: Cash management using the Miller Orr Model

formulae	$Spread = 3\left(\frac{\frac{3}{4} \times transaction\ cost \times variance}{Interest\ rate}\right)^{\frac{1}{3}}$
	Return point = Lower limit $\frac{1}{3}$ x Spread

When the cash balance reaches the upper limit, the firm invests the excess in marketable securities. When it hits the lower limit, the firm sells securities to replenish cash. There's also a return point between these limits where the balance returns after hitting either limit.

The model determines three critical points:

Lower limit (L): Set by management based on minimum desired cash balance

Upper limit (H): Calculated using the formula

Return point (Z): The optimal cash balance to return to after hitting a limit

Calculating return point and boundaries using the MO model:

Z = Return point	L = Lower limit	H = Upper limit
σ^2 = Variance of daily cash flows	F = Fixed transaction cost	i = Daily interest rate

Assume:

Lower limit (L) = FRW10,000	Variance of daily cash flows (σ^2) = FRW4,000,000
Fixed transaction cost (F) = FRW100	Daily interest rate (i) = 0.03% (about 11% annually)

Step 1: Calculate the return point (Z)

Z = 10,000 + (3/4 * (3 * 4,000,000 * 100 / (4 * 0.0003)) ^ (1/3))

Z = 10,000 + 13,595 = FRW23,595

Step 2: Calculate the upper limit (H)

H = 3 * 23,595 - 2 * 10,000 = FRW50,785

4.3.1 Limitation of the model

The Miller-Orr model has several limitations which include;

- Assumes that cash flows follow a trendless random walk, which may not always be true.
- Requires estimation of cash flow variance, which can be challenging and may change.
- Doesn't consider the possibility of running out of marketable securities.
- May lead to frequent transactions if cash flows are highly volatile.

4.3.2 Limitations of both models

Since these models are designed for managing cash and cashflow, they share some limitations and these include;

- Don't account for seasonal variations in cash flows.
- May not be suitable for very large corporations with complex cash management needs.
- Don't consider the impact of inflation or changing interest rates.
- Simplify the relationship between cash holdings and opportunity costs.

Despite these limitations, both models provide valuable frameworks for thinking about cash management and can be useful starting points for developing more sophisticated cash management strategies.

4.4 Cashflow Forecasts

A cashflow forecast is crucial for anticipating financial positions, identifying potential shortages or surpluses, informing strategic decisions, ensuring obligations are met, planning for growth or downturns, and demonstrating financial health to stakeholders and lenders, making it an indispensable tool for proactive financial management.

Cashflow forecasts serve several important purposes:

Predicting future cash positions:	They help businesses anticipate their cash balance at various points in the future.
Identifying potential shortfalls:	Forecasts can reveal periods when a business might face cash shortages, allowing for proactive planning.
Planning for surpluses:	They also show when excess cash might be available for investments or expansion.
Informing financial decisions:	Forecasts guide decisions about timing of major expenses, loan repayments, or dividend payments.
Budgeting:	They assist in creating realistic budgets based on expected cash inflows and outflows.
Investor and lender communication:	Forecasts can be used to demonstrate financial health to potential investors or lenders.

Cash Forecast Example

Katonga is planning to start a business selling ice-creams the city.

He has produced the following estimates of receipts and payments for the first seven months of business.

	Jan	Feb	Mar	Apr	May	Jun	Jul
Sales	10,000	12,000	14,000	20,000	30,000	50,000	60,000

i. All sales are cash sales. This means that the cash is received in the month of sale.

ii. Purchases are 30% of each month's sales.

Purchases are paid in cash in the month in which the goods are purchased.

iii. General expenses are 20% of sales, paid for in the month of sale.

iv. A tax demand is received and paid for in July for

v. Wages are £2,500 paid each month

vi. Drawings are £1,000 per month

Sample Cashflow forecast-No Credit

Using the details above a sample cashflow forecast would look like this,

		Jan	Feb	Mar	Apr	May	Jun	Jul
		FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s
Receipts								
Sales	100%	10,000	12,000	14,000	20,000	30,000	50,000	60,000
Total Receipts	A	10,000	12,000	14,000	20,000	30,000	50,000	60,000
Payments								
Purchases	30%	3,000	3,600	4,200	6,000	9,000	15,000	18,000
General Expenses	20%	2,000	2,400	2,800	4,000	6,000	10,000	12,000
Tax								8,400
Wages		2,500	2,500	2,500	2,500	2,500	2,500	2,500
Drawings		1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total payments	B	8,500	9,500	10,500	13,500	18,500	28,500	41,900
Net Cashflow	A-B=C	1,500	2,500	3,500	6,500	11,500	21,500	18,100
Opening bank balance	D	0	1,500	4,000	7,500	14,000	25,500	47,000
Closing bank balance	C+D	1,500	4,000	7,500	14,000	25,500	47,000	65,100

If the company decides to extend credit to 30% of their customers along them to pay after 30 days, sales will increase by 10% which is good for business. However, the cash they receive would change and the forecast would look like this.

		Jan	Feb	Mar	Apr	May	Jun	Jul
		FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s
Receipts								
Sales - Cash	70%	7,700	9,240	10,780	15,400	32,100	38,500	46,200
Sales - Credit	30%		3,300	3,960	4,620	6,600	9,900	16,500
Total Receipts	**A**	**7,700**	**12,540**	**14,740**	**20,020**	**29,700**	**48,400**	**62,700**
Payments								
Purchases	30%	2,310	3,762	4,422	6,006	8,910	14,520	18,810
General Expenses	20%	1,540	2,508	2,948	4,004	5,940	9,680	12,540
Tax								8,400
Wages		2,500	2,500	2,500	2,500	2,500	2,500	2,500
Drawings		1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total payments	**B**	**7,350**	**9,770**	**10,870**	**13,510**	**18,350**	**27,700**	**43,250**
Net Cashflow	A-B=C	350	2,770	3,870	6,510	11,350	20,700	19,450
Opening bank balance	D	0	350	3,120	6,990	13,500	24,850	45,550
Closing bank balance	**C+D**	**350**	**3,120**	**6,990**	**13,500**	**24,850**	**54,550**	**65,000**

Analysis

Since the company has decided to extend credit to its customers, sales have increased every month as follows;

		Jan	Feb	Mar	Apr	May	Jun	Jul
		FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s
Opening Sales		10,000	12,000	14,000	20,000	30,000	50,000	60,000
New Sales		11,000	13,200	15,500	22,000	33,000	55,000	66,000
Increase		1,000	1,200	1,400	2,000	3,000	5,000	6,000

This is good for business. However, we need to analyse how this will change the cash balances for each month. The differences in cash balances would be as follows;

		Jan	Feb	Mar	Apr	May	Jun	Jul
		FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s	FRW 000s
Opening Sales		1,500	4,000	7,500	14,000	25,500	47,000	65,100
With credit Sales		350	3,120	6,990	13,500	24,850	45,550	65,000
Increase		(1,500)	(880)	(510)	(500)	(650)	(1,450)	(100)

We notice that the monthly balances have decreased which means that they would receive less cash every month despite selling more. Overall, they would end up with more cash over the year, but they will be a delay on the cash, and this would affect working capital. The solution would be to arrange some form of short-term credit as discussed earlier. They need to make sure that the cost of credit does not outweigh the increase in the sales.

Unit E Key Terms

Capitalisation E1
Cash deficit E5
Cash Operating cycle E1
Cash surplus E5
Early settlement discount E3
EOQ E2
ERP management software E2
Factoring E3
Holding costs E2
Just in Time (JIT) E2
Key Terms
Lead times E2
Liquidity E1
ordering costs E2
Overcapitalisation E1
overtrading E1
precautionary motive E4
Profitability E1
Speculative motive E4

Summary of Unit E and key learning outcomes

Learning Outcomes	Summary
Introduction to working capital	In this unit, we have explored the fundamental concepts of working capital management. We began by examining the key objectives of working capital: profitability, liquidity, and capitalisation. The unit then delved into the inherent conflict between profitability and liquidity, highlighting the challenges financial managers face in balancing these competing goals. We discussed various approaches to managing working capital needs, including aggressive and conservative policies, and the importance of finding a balanced approach. The working capital cycle was introduced, along with relevant ratios and the concept of the **cash operating cycle**. Finally, we explored the risks of **overtrading** and **undercapitalisation**, discussing their signs and potential consequences. Throughout, we emphasised the critical role of effective working capital management in ensuring a company's short-term financial health and long-term success.
Inventory management	We moved on to explore inventory management, a crucial aspect of working capital. We began by discussing the fundamental principles of inventory management and its impact on a company's financial performance. We then focused on the trade-off between **ordering costs** and **holding costs**, introducing the **Economic Order Quantity (EOQ)** model as a tool for optimising inventory levels. We examined the components of both ordering and holding costs and discussed the importance of lead times in inventory decisions. The section concluded with advanced inventory management methods, particularly **Just-In-Time (JIT)** systems, and the role of technology such as **Enterprise Resource Planning (ERP)** software in modern inventory management.
Receivables and payables management	To understand working capital management even better, we explored receivables and payables management. We focused on strategies for managing receivables, including effective credit control and early settlement discounts to encourage prompt payment. Factoring was examined as a method to improve cash flow. For payables, we discussed the strategic use of settlement discounts. Throughout, we emphasised balancing customer relationships with timely cash inflows and optimal use of supplier credit.

Learning Outcomes	Summary
Cash management and Cash Forecasting	Finally, we examined cash management and forecasting as critical components of working capital strategy. We explored motives for holding cash, including **precautionary and speculative reasons**, and their associated costs. The unit introduced the **Baumol and Miller-Orr models**, discussing their applications and limitations in optimising cash balances. We then focused on cash flow forecasting techniques, addressing the management of **cash surpluses and deficits.** Throughout, we emphasised how effective cash management ensures liquidity, meets obligations, and enables strategic investment opportunities.

Quiz questions

1. The demand for a product is 5,000 units for a 6-month period. Each unit has a purchase price of £140 and ordering costs are £60 per order placed. The annual holding cost of one unit in stock is 15% of the purchase price.

   What is the Economic Order Quantity (rounded up to the nearest unit)

   A) 169 units

   B) 239 units

   C) 632 units

   D) 1,006 units

2. Which of the following is typically considered the most significant cost of holding cash?

   A) Storage and security costs

   B) Opportunity cost

   C) Handling and transaction costs

   D) Audit and compliance costs

3. What are the key objectives of working capital management?

   A) Profitability and liquidity

   B) Profitability, liquidity, and capitalisation

   C) Profitability and capitalisation

   D) Liquidity and capitalisation

4. Which of the following is a strategy for managing receivables? (select all that apply)

   A) Increasing credit terms for all customers

   B) Implementing early settlement discounts

   C) Ignoring overdue accounts

   D) Eliminating all credit sales

5. What is the main purpose of the Miller-Orr model in cash management?

   A) To determine the optimal inventory level

   B) To calculate the Economic Order Quantity

   C) To optimise cash balances

D) To forecast long-term cash flows

6. Which of the following statements are true about debt factoring? (Select all that apply)

   A) Debt factoring involves selling accounts receivable to a third party at a discount.

   B) In non-recourse factoring, the factor assumes all credit risk for the purchased receivables.

   C) With recourse factoring always provides a higher advance rate than non-recourse factoring.

   D) In with recourse factoring, the company selling the receivables retains the risk of non-payment.

   E) Factoring can improve a company's cash flow by providing immediate access to cash.

   F) Non-recourse factoring typically involves higher fees due to the increased risk for the factor.

   G) Debt factoring eliminates the need for a company to manage its accounts receivable entirely.

7. A company has provided the following financial information for the past year:

Annual credit sales: FRW10,000,000	Annual cost of goods sold: FRW7,500,000	Average inventory: FRW1,500,000
Average accounts receivable: FRW800,000	Average accounts payable: FRW600,000	Days in year: 365

   Calculate the cash operating cycle (cash conversion cycle) in days. Round your answer to the nearest whole number.

8. Which of the following is a strategy for managing receivables?

   A) Increasing credit terms for all customers

   B) Implementing early settlement discounts

   C) Ignoring overdue accounts

   D) Eliminating all credit sales

9. Which of the following statements are true about the Baumol model of cash management? (Select all that apply)

   A) It assumes that cash is withdrawn in equal amounts at regular intervals.

   B) The model considers the opportunity cost of holding cash.

   C) It's primarily used for managing accounts receivable.

D) The model helps determine the optimal cash balance a company should maintain.

E) It assumes that cash outflows occur at a constant rate over time.

F) The model ignores transaction costs associated with converting securities to cash.

G) It's also known as the Economic Order Quantity (EOQ) model for cash management.

10. In the Miller-Orr model of cash management, what happens when the cash balance reaches the upper control limit?

A) Cash is immediately transferred to marketable securities to bring the balance back to the target level

B) The company borrows money to increase the cash balance

C) No action is taken until the cash balance falls below the lower limit

D) The model automatically adjusts the upper and lower limits

Unit E References and further reading

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Unit F: The dividend decision

Learning outcomes

F1. Theories and recognised policies

F2. Practical factors

F3. Alternatives to dividends

F4. Efficient market hypothesis

Introduction to Unit F

In this unit, we take a closer look at the dividend decision. We will pay close attention to the factors that the financial manager must consider when making the dividend decision. Earlier, we discussed the concept of maximisation of shareholders' wealth, which, simply put, means that shareholders either receive dividends or benefit from an increase in share price.

We will consider how shareholders' perception of dividends (as an indication of profit) can affect their view of the organisation. This, in turn, can also affect the share price of the organisation. We will explore how the efficient processing of information impacts this by examining the efficient market hypothesis. We will also look at some alternatives to dividend that could be viewed by shareholders positively.

It is important to understand that the perception of the shareholders affects the share price, so care must be taken in making decisions that affect the way the shareholder view the organisation.

F1 Theories and recognised policies

1.1 Dividend Policies

When determining the dividend payout to shareholders, directors need to consider the cash required for investment needs and the impact of these dividend payments on the company's financing needs. They also need to consider other practical factors.

1.1.1 The three key decisions

Earlier, we considered the 3 key decisions that the directors need to make. One of these decisions was dividend. The diagram below demonstrates that each decision affects the other. If they pay all the profits as dividend, they might not have enough to invest, or they will need to look for finance or fund their investment needs. Care needs to be taken when deciding how much dividend to pay and this also be affected by other decisions.

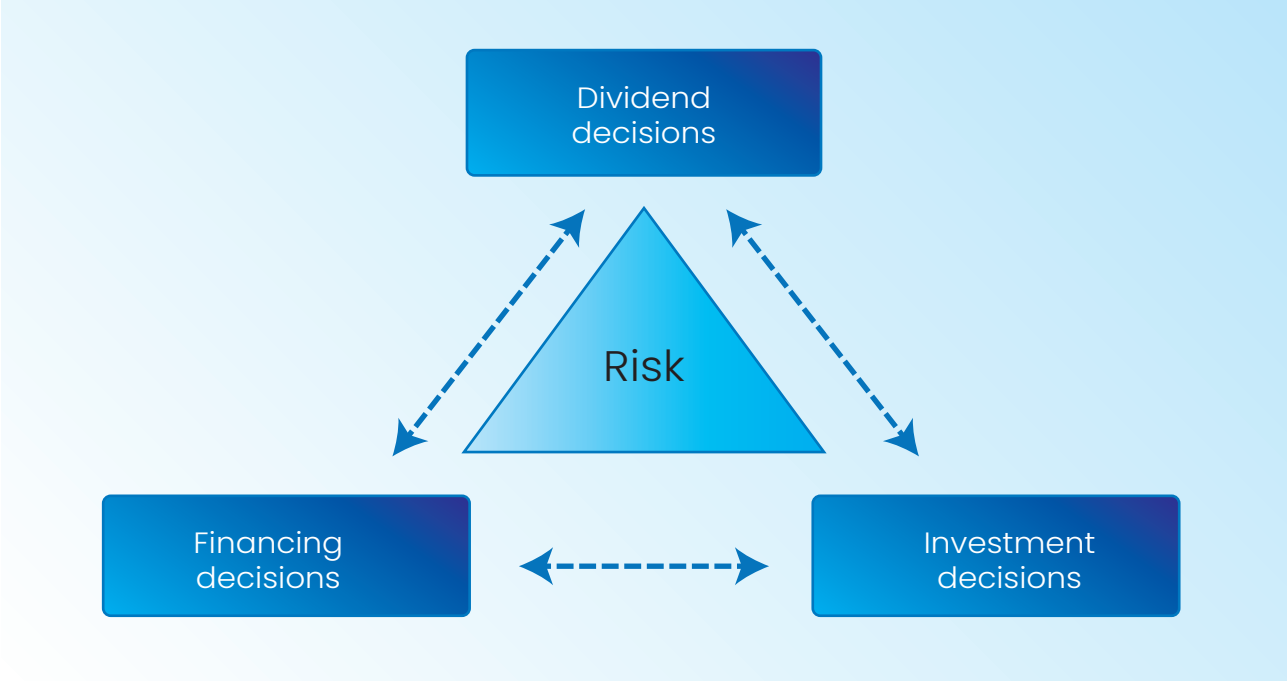

Figure 34: The 3 key decisions; Dividend Decision

If the company is in a growth phase, it likely won't have enough liquidity to pay dividends due to the need for investment in non-current assets. In such a scenario, shareholders may expect low or no dividends, but this will depend on the dividend policy (discussed in this unit). However, this should not be an issue if the investments are creating value for shareholders, thereby increasing the share price.

A company can finance its investments through borrowing and still pay dividends if it has accumulated net realised profits. However, this approach may lead to issues associated with higher borrowing levels.6

1.1.2 Shareholder Expectations

Since shareholders mainly care about maximisation of their wealth, an increase in dividends is viewed positively by shareholders. However, a decrease can also be seen as favourable if it signals that the company is pursuing attractive investment opportunities. Regardless of the dividend amount, if it does not meet shareholder expectations, it sends an unexpected signal that something could be wrong with the company, and this could cause the share price to decline.

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[6] *BPP F9 Financial Management*

Since shareholders lack the same information as directors regarding the company's future prospects, dividend can be seen as a signal from directors about the strength of underlying project cash flows. Therefore, it is generally advisable for a company to maintain a consistent dividend policy whenever possible.7

1.1.3 Types of policies

Policy	Detail of policy	Impact on shareholders
Constant Policy	Dividend is paid as a % of profit.	This can create fluctuations on the dividend that is paid every year depending on the profit.
Stable growth policy	Dividend increases (grows) every year.	Shareholders receive a growing dividend and assume the company is doing well.
Residual policy	Dividend is only paid after a positive NPV investment project have been funded. The excess (residual) is paid as dividend.	This could mean they might not get a dividend if there are positive opportunities.

Dividend policy can be affected by the size and age of the organisation. More stable and established companies are likely going to pay a constant or growing (stable growth) while new companies might use a residual policy or not pay dividend at all.

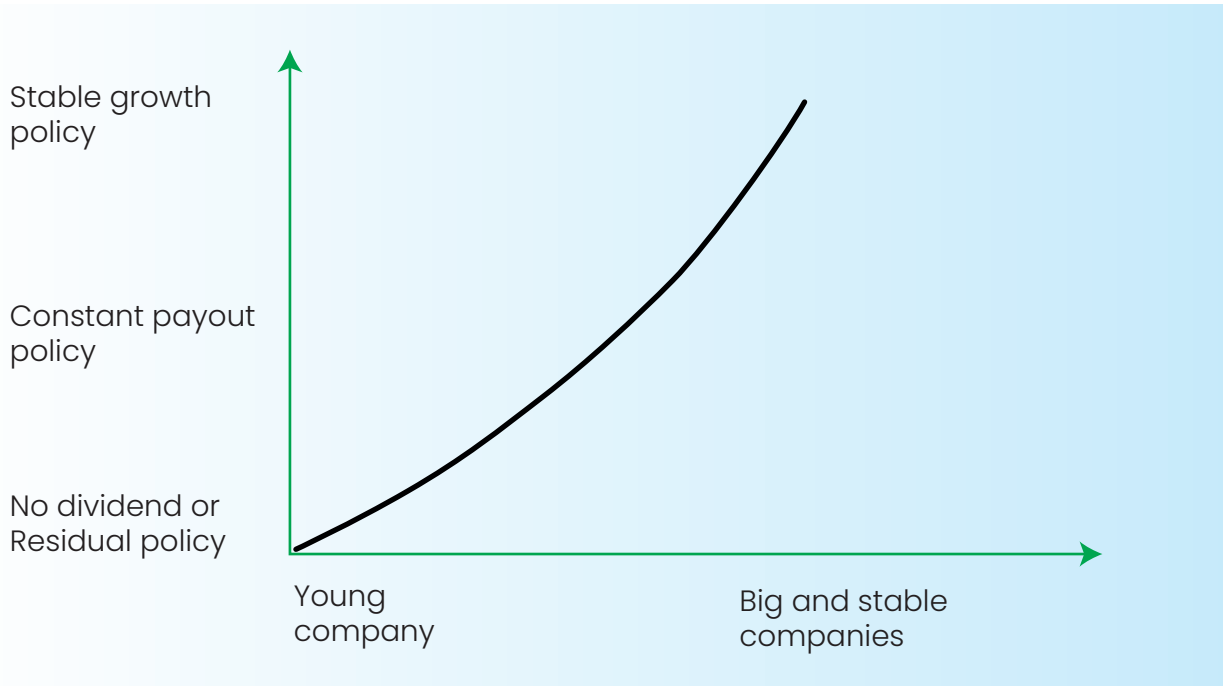

Figure 35: Dividend policies based on growth stage

[7] *Kaplan Knowledge Bank- https: //kfknowledgebank.kaplan.co.uk/financial-management*

1.2 Dividend Irrelevancy theory

The dividend irrelevancy theory, proposed by Miller and Modigliani, suggests that a company's dividend policy does not affect its stock value or cost of capital in perfect markets. Consider Microsoft and Google (Alphabet), two tech giants. Microsoft pays regular dividends, providing steady income to shareholders. Equally, Google has never paid dividends, reinvesting profits into growth and innovation. Despite differing dividend policies, both companies have achieved substantial market value and investor confidence. This demonstrates that dividends can be irrelevant to a firm's valuation, as investors focus more on overall profitability, growth potential, and market position rather than the dividend payout.

The conclusion from this can be that dividend policy is irrelevant if the shareholders believe in what the directors are doing with the company. This can also be linked to the Efficient Market Hypothesis, which will be discussed later in this unit.

1.2.1 Assumptions and Limitations

M&M made several assumptions in coming up with this theory and these need to be considered before simply stating that dividend is irrelevant. The assumptions were;

Assumptions	Limitations
Taxes do not exist	Companies pay tax and shareholders also pay tax. **Capital gains tax** and **dividend tax** are also different in different countries, and this could affect the preference of the shareholder.
Information is readily available to all shareholders	Information can be available to everyone, but financial managers have access to tools and predictive models which makes them better equipped to make decisions.
There are no transaction costs	Selling shares comes will some transaction costs and dividends normally just pay tax and no transaction costs so shareholders could prefer dividends.
Capital markets are perfectly efficient.	This implies that a company does not consider paying dividend to use the funds for investment, but this can be an easy and cheaper option.

F2 Practical factors

2.1 Practical implications of dividend decisions

2.1.1 Factors the affect dividend payment

There are several factors that affect dividend payments. The financial manager needs to consider how each of these factors influences the decision to pay dividends. While each factor impacts the dividend decision individually, it is the collective impact of these factors that financial managers take into consideration when deciding on dividend payments. We will have a look at some of them in detail, some of them have been discussed in

greater detail in other units.

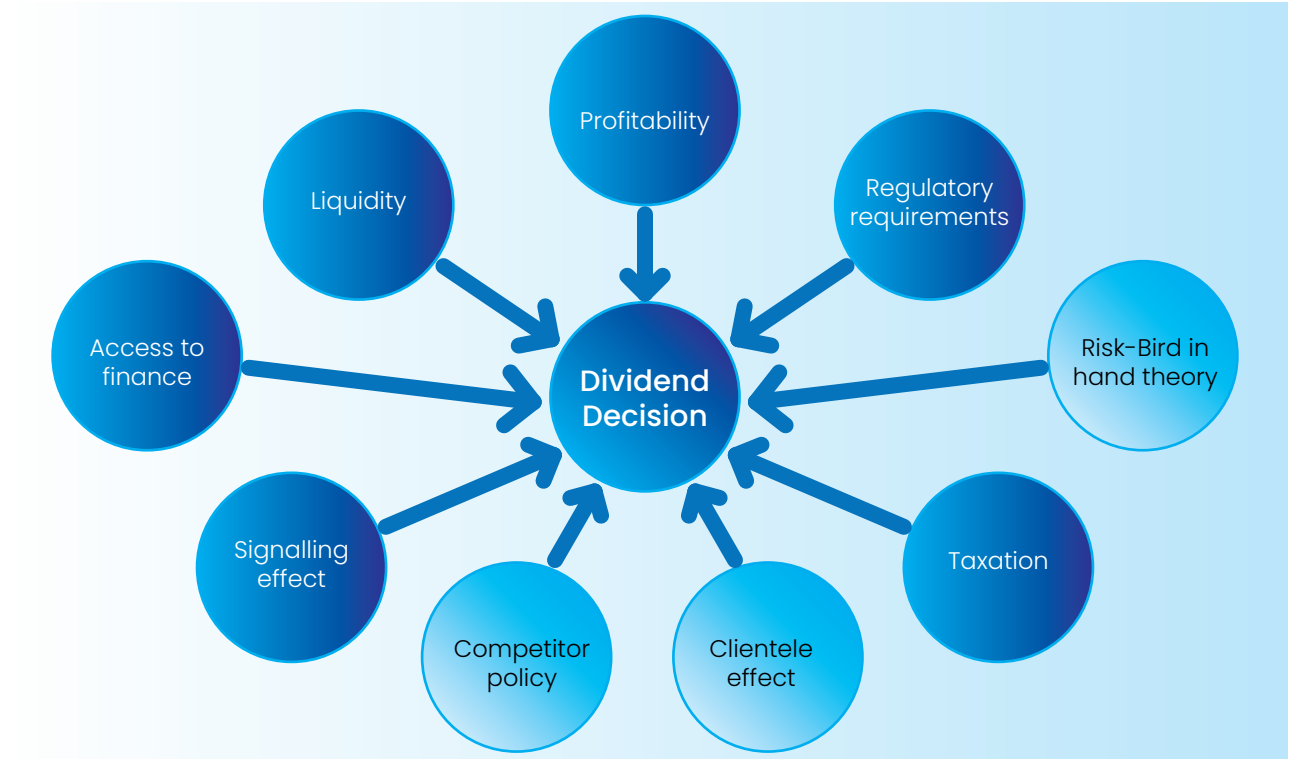

Figure 36: Factors the affect dividend payment

2.1.2 Clientele effect

One important consideration is the clientele effect, which refers to the preference of different groups of investors for different dividend policies. Some investors prefer high dividend payouts, while others prefer capital gains. The financial manager must understand the preferences of the company's current and potential shareholders and how these preferences might influence the stock price and investor satisfaction.

The clientele effect suggests that:

- Different groups of investors (clienteles) are attracted to stocks with dividend policies that match their preferences
- Companies tend to attract investors whose preferences align with their established dividend policy
- Changes in dividend policy might lead to changes in a company's investor base

2.1.3 Bird in hand theory

The "Bird in the Hand" theory, proposed by Myron Gordon and John Lintner, suggests that investors prefer the certainty of dividends over the potential future capital gains from reinvesting profits. According to this theory, investors value a dividend today more than an uncertain capital gain in the future. This preference arises because dividends are perceived as less risky than potential future gains, thus making them more attractive to risk-averse investors.

Real world Example
Shareholders are likely to prefer stable, established company that consistently pays dividends, such as Coca-Cola over a high-growth tech company that does not pay dividends because they value the regular income stream. This goes with the old idiom that "A bird (one) in hand is worth more than two in the bush"

F3 Alternatives to dividends

3.1 Alternatives to dividend

3.1.1 Scrip Dividend

A scrip is a substitute or an alternative to legal tender. In the case of dividend, a scrip dividend is a dividend payment in the form of share instead of cash. The preference of this form of payment could be affected by shareholder choice and other factors like tax. There are several implications on the company and the shareholders of using a scrip dividend which include;

Company	Shareholders
Can save tax due to not paying dividends	Can save on **dividend tax.**
Can reduce gearing due to more shares being issued	A company with **lower gearing** seems much safer for the shareholder.
This can save transactions cost of issuing new shares to raise funds.	Can be an easy way to obtain more shares in a company you already have investments **saving time** and **transactions costs**
Can save cash and is a quicker method of raising finance for investment needs	**Quicker** was of obtaining more shares in a company
An increase in shares could mean an increase in dividends in the future	The price of share could **fall** as a result.

3.1.2 Bonus Issue

These are additional shares given to existing shareholders without any additional cost, based on the number of shares that a shareholder owns. Shareholders receive additional shares proportional to their existing holdings, which rewards them without paying out cash and may increase market liquidity as more shares become available.

Bonus Issues are very similar to scrip dividend, so it is important to look at the key differences;

	Bonus Issue	Scrip Dividend
Nature	Given without any cash outflow or reduction in reserves.	Given in **place of cash dividends**, reducing the cash outflow of the company.
Purpose	To **capitalise reserves** and reward shareholders.	To provide an **alternative to cash dividends** and conserve cash.
Shareholder Choice	**No choice:** shareholders automatically receive additional shares.	Shareholders typically have the **option to choose** between cash or shares.
Financial Impact on company	**Does not affect cash** position but reduces reserves.	**Reduces the amount of cash** paid out in dividends.
Example	**1: 10 bonus issue-** this is an extra share for every 10 shares held	Declared dividend of FRW10 per share held with an option of cash or additional shares

3.1.3 Stock re-purchase

This can be known as a share buyback. In this case the company will buy back shares from the shareholders using the funds they could have paid as dividend.

A share re-repurchase may be appropriate in certain instances which include;

- Utilising excess funds, when they are no viable investment opportunities.
- Releasing funds to the shareholders without increasing or changing the dividend policy.
- Increasing gearing of the company which would impact the cost of capital (in the form of WACC)-remember debt is cheaper than equity
- Can be used as a positive signal to the market and the shareholders.

Real world Example

A recent example of a company engaging in a share buyback is Shell. On May 2, 2024, Shell announced a $3.5 billion share buyback programme intended to reduce the issued share capital of the company Shell Global (Shell, 2024)

Another example is Stellantis, which launched a share buyback programme on February 28, 2024. The first tranche was completed by May 1, 2024, with the company repurchasing a total of 41,094,781 common shares. The second tranche began on May 23, 2024, with a maximum amount of up to €1 billion Stellantis.com. (Stellantis , 2024)

3.1.4 Stock splits

A stock split is an action in which a company issues additional shares to shareholders, increasing the total by the specified ratio based on the shares they held previously (Investopedia, 2024). This increases the number of shares without increasing the total dollar value of the shares. Market capitalisation also remains the same.

For example, if a company with 2 million shares priced at FRW50 each announces a 2-for-1 stock split, it will have 4 million shares priced at FRW25 each post-split. This increases liquidity and the new shares will be seen as affordable at FRW25 a share.

F4 Efficient market hypothesis

4.1 Types of market efficiency

There are three types of market efficiency in financial markets: allocative efficiency, which refers to the market's ability to direct funds to the most profitable borrowers; operational efficiency, which describes the market's capability to operate with minimal transaction costs; and information processing (or pricing) efficiency, where the market price of securities reflects all relevant and available information about the securities and the issuing company. These efficiencies collectively ensure optimal resource allocation, cost-effectiveness, and accurate pricing in financial markets.8 Capital markets have been seen to reflect this information in share prices with varying levels. The efficient market hypothesis, groups these into four main categories shown below.

4.2 Levels of market efficiency

All information including privately held information e.g. change of leadership or scrip dividend decision	Does **not** reflect	Does **not** reflect	Does **not** reflect	Reflects
All **publicly available information** about the company e.g. profits from published accounts	Does **not** reflect	Does **not** reflect	Reflects	Reflects
Historical information and past share price movements	Does **not** reflect	Reflects	Reflects	Reflects
Level of efficiency	**Zero efficiency**	**Weak form efficiency**	**Semi-strong efficiency**	**Strong form efficiency**

4.2.1 Zero efficiency

Zero efficiency, in the context of financial markets, refers to a hypothetical state where market prices do not reflect any information at all. This would mean that stock prices are completely random and do not incorporate any past, public, or private information about the securities or the issuing companies

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[8] *BPP ACCA F9 Financial Management- Types of market efficiency*

Share prices will often be mispriced, allowing investors to make excess profits over the long term by studying the market to identify over- or under-priced shares, for example, by analysing past share price movements, a practice known as Chartism or technical analysis.

4.2.2 Weak form efficiency

Under weak form prices reflect all past market data such as stock prices and volume. Investors can't make excess profits over the long term by studying past share price movements because share prices move unpredictably due to new information, following a 'random walk' according to random walk theory. However, in a weak-form efficient market, investors can still make excess profits by quickly analysing and reacting to new information before the market fully responds.

4.2.3 Semi-strong efficiency

For semi-strong efficiency, prices reflect all publicly available information including financial statements, news, and economic factors. Professional investors can't beat the market in the long term either by analysing past price patterns (as in weak form efficiency) or by analysing the implications of new publicly available information. Over the long term, investors will not be able to make above-average profits by consistently identifying shares with a fundamental value that materially differs from their market value.

4.2.4 Strong form efficiency

Prices reflect all information, both public and private, meaning even insider information is reflected in stock prices. Share prices will respond to new developments and events before they even become public knowledge. This occurs through information held privately by directors; however, in theory, directors are not allowed to trade shares using this information, as this would constitute insider trading, which is illegal.

Real world Example

An example of insider trading is the case of Martha Stewart and ImClone Systems. In December 2001, Martha Stewart sold about 4,000 shares of ImClone Systems based on non-public information. Stewart's broker, Peter Bacanovic, had tipped her off that the CEO of ImClone, Samuel Waksal, was attempting to sell his shares because the FDA was about to reject ImClone's new cancer drug, Erbitux.

This tip allowed Stewart to avoid a significant financial loss when the stock price plummeted after the FDA's decision became public. The incident led to a highly publicised trial, resulting in Stewart being convicted of charges related to insider trading, including obstruction of justice and lying to investigators. She was sentenced to five months in prison, five months of home confinement, and fined.

This case illustrates the illegal nature of trading based on material, non-public information, and the serious legal consequences that can follow.

Unit F Key Terms

Constant Payout F1
Stable growth F1
Residual Policy F1
M&M Dividend irrelevancy theory F1
Signalling effect F2
Clientele effect F2
Bird in hand theory F2
Bonus issues F3
Stock re-purchase F3
Stock splits F3
Scrip dividend F3
Allocative Efficiency F4
Operational Efficiency F4
Information processing efficiency F4
Weak form efficiency F4
Semi-strong efficiency F4
Strong form efficiency F4

Summary of Unit F and key learning outcomes

Learning Outcomes	Summary
Theories and recognised policies	In our final unit, we explored dividend policies and their theoretical foundations. We examined the three key financial decisions, focusing on how dividend policy interacts with investment and financing choices. The unit covered various dividend policy types, including constant payout, stable growth, and residual policies. We then delved into the Modigliani and Miller (M&M) Dividend Irrelevancy Theory, discussing its assumptions and limitations. Throughout, we emphasised the complex interplay between dividend policies and shareholder value, considering how different approaches might impact investor perceptions and company valuation.
Practical factors	We moved on to examine the practical factors influencing dividend decisions. We explored various elements that affect dividend payments, such as company performance, growth opportunities, and financial stability. The unit focused on two key theories: the Signalling Effect, which suggests that dividend changes convey information about a company's future prospects, and the Clientele Effect, which posits that different investor groups prefer different dividend policies. We also discussed the Bird in Hand theory, which argues that investors prefer the certainty of dividends over potential future capital gains. Throughout, we emphasised how these practical considerations shape real-world dividend policies and influence investor behaviour.
Alternatives to dividends	We then moved on to explore alternatives to traditional cash dividends. We examined various methods companies use to return value to shareholders beyond regular dividend payments. The unit covered bonus issues, where additional shares are given to existing shareholders, and stock repurchases, which can increase earnings per share and potentially boost stock prices. We also discussed stock splits, which can make shares more accessible to a broader range of investors, and scrip dividends, where shareholders receive additional shares instead of cash. Throughout, we analysed the advantages and disadvantages of each method, considering their tax implications and effects on company valuation and shareholder wealth.

Learning Outcomes	Summary
Efficient market hypothesis	Finally, we delved into the Efficient Market Hypothesis (EMH), a cornerstone theory in financial economics. We explored three types of market efficiency: allocative, operational, and information processing efficiency. The unit then focused on the levels of market efficiency, starting with the concept of zero efficiency as a baseline. We examined weak form efficiency, which posits that past price information is fully reflected in current prices; semi-strong efficiency, suggesting that all publicly available information is incorporated; and strong form efficiency, proposing that even insider information is reflected in market prices. Throughout, we discussed the implications of these efficiency levels for investment strategies and market behaviour.

Quiz questions

1. Which form of the Efficient Market Hypothesis (EMH) states that stock prices reflect all publicly available information, including historical price data and financial reports?

   A) Weak Form Efficiency

   B) Semi-Strong Form Efficiency

   C) Strong Form Efficiency

   D) Zero Efficiency

2. A company is considering issuing bonus shares. Which of the following statements about bonus issues is correct?

   A) A bonus issue increases the company's share capital but decreases retained earnings.

   B) Bonus issues result in an immediate increase in the company's market capitalisation.

   C) Existing shareholders must pay for bonus shares at the current market price.

   D) A bonus issue dilutes the ownership percentage of existing shareholders.

3. Which of the following statements best describes a key advantage of a scrip dividend for a company?

   A) It always results in higher dividend payments to shareholders

   B) It allows the company to retain cash while still rewarding shareholders

   C) It guarantees an increase in the company's share price

   D) It reduces the overall number of shares in circulation

4. In the context of financial markets, allocative efficiency refers to:

   A) The speed at which new information is incorporated into asset prices

   B) The optimal distribution of financial resources to their most valuable uses

   C) The minimization of transaction costs in trading securities

   D) The equal distribution of wealth among market participants

5. ABC co has decided to focus on paying back debt obligations instead of paying dividend. How does the interaction between a company's profitability and its debt obligations influence its dividend policy, and what are the potential implications for shareholders if the company prioritises debt repayment over dividend payments?

   A) High profitability reduces the ability to pay dividends, and prioritising debt repayment always benefits shareholders by increasing short-term income.

   B) High profitability increases the ability to pay dividends, but prioritising debt

repayment can have both positive and negative implications for shareholders.

C) Debt obligations are irrelevant to dividend policy, and prioritising debt repayment only positively affects the company's long-term stability.

D) Profitability has no impact on dividend payments, and debt repayment prioritisation has no implications for shareholders.

6. According to the dividend irrelevance theory proposed by Miller and Modigliani, which of the following statements is correct?

A) A company's dividend policy has a significant impact on its market value

B) Investors prefer companies that pay higher dividends

C) In perfect capital markets, a company's dividend policy does not affect its value

D) Companies can increase their market value by increasing dividend payouts

7. Which of the following best describes the signalling effect of dividends in corporate finance?

A) The tendency of stock prices to fall immediately after a dividend payment

B) The use of dividend policy to convey information about a company's future prospects

C) The impact of dividend announcements on bond yields

D) The preference of institutional investors for high-dividend stocks

8. What does the clientele effect suggest about a company's dividend policy?

A) Companies should frequently change their dividend policy to attract diverse investors

B) Dividend policy is irrelevant as it doesn't affect a company's value

C) Companies attract investors whose preferences match their dividend policy

D) All investors prefer high dividend paying stocks

9. According to the Bird in the Hand theory of dividend policy, which of the following statements is most accurate?

A) Investors are indifferent between dividends and capital gains

B) Investors prefer dividends over potential future capital gains

C) Companies should reinvest all earnings to maximise shareholder value

D) Dividend policy has no impact on a company's stock price

10. The table below shows a company's earnings and the dividend they have been paying for the past four years.

Year	Earnings	Dividends Paid
1	FRW10 million	FRW1 million
2	FRW15 million	FRW1 million
3	FRW7 million	FRW1 million
4	FRW11 million	FRW1 million

Based on the provided financial data, predict which dividend policy the company is likely following.

A) Residual Dividend Policy

B) Stable Dividend Policy

C) Irregular Dividend Policy

D) Hybrid Dividend Policy

Unit F References and further reading

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Exercises solutions

Quiz answers

Unit A Answers

Question	Answers
1 B	B) More efficient use of shareholders' equity
2 C	C) The stock might be undervalued
3	Correct answers: **[✓]** Inventory [✓] Cash and Cash Equivalents [X] Long-term Debt [✓] Accounts Receivable [✓] Prepaid Expenses
4	Correct answers: [✓] Net Profit [✓] Preferred Dividends [✓] Number of Outstanding Ordinary Shares [ ] Market Price per Share [ ] Total Assets
5 A	A) Financial, Customer, Internal Business Process, Learning and Growth.
6 B	TSR = TSR = = 25%
7 B	B) Economy relates to input costs, Efficiency to the conversion of inputs to outputs, and Effectiveness to achieving desired outcomes
8 A,B,C,D	Correct answers are ABCD
9 B	Quick Ratio (Acid-Test Ratio) = Current Assets = FRW225,000 Inventory = FRW100,000 Current Liabilities = FRW200,000 Therefore, Quick ratio is -= 0.63
10	A,B,D,E,G
11	1-B, 2-A, 3-D, 4-C, 5-F, 6-E
12	A, C, D, E

Back to Unit A questions

Unit B Answers

Question	Answers
1 B	B) All household income is spent on goods and services, and all firm revenue is paid out as income to households.
2 C	C) Household savings deposited in a bank.
3 C	C) Injections will increase, potentially boosting firm revenue and household income.
4 B	B) A reduction in income tax will increase 'real' household income, and so demand for normal products will shift to the right, i.e. quantity demanded will be greater at any given price
5 B	B) Trough, Recovery, Peak, Recession
6 A,C,E	Correct answers: A, C, E, During recovery, overall economic output grows. Businesses tend to increase capital expenditures and investments. As economic conditions improve, consumers become more optimistic. This leads to increased spending, further fuelling economic growth.
7 B, C, E, F	Correct answers: B, C, E, F
8 B, C, E, G, H	Correct answers: B, C, E, G, H
9 B	B) Price cartels are illegal in most countries as they are considered anti-competitive.
10	1-B,2-E, 3-D, 4-A, 5-C, 6-F
11	1.Perfect Competition: B 2.Market Imperfection: F 3.Government Intervention: D 4.Monopoly: A 5.Oligopoly: E 6. Differentiation: C
12 B	B) Externalities.

Back to Unit B questions

Unit C Answers

Question	Answers
1 C	C) Sunk costs
2 B	B) It's simple to understand and calculate
3 A	A) (Average annual profit / Initial investment) x 100
4	Correct answers: C, D, E, F, H
5 B	This answer is closest to the calculated NPV of approximately FRW21,614.
6 B	B) Project B should be chosen because it has a higher NPV
7 C and E	C) FRW85,000 E) FRW49,000
8B	B) To compare projects with different lifespans on an annual basis
9B, C, D, G	B, C, D, G
10 A	20% chance of FRW5,000 profit: 0.20 × FRW5,000 = FRW1,000 50% chance of FRW2,000 profit: 0.50 × FRW2,000 = FRW1,000 30% chance of FRW1,000 loss: 0.30 × (-FRW1,000) = -FRW300 Now, we sum these values: FRW1,000 + FRW1,000 + (-FRW300) = FRW1,700 Therefore, the expected value of the investment is FRW1,700, which corresponds to option A.

Back to Unit C questions

Unit D Answers

Question	Answers
1 C	C) Commercial paper
2 B	B) Overdraft
3	A,C,E Ordinary share capital doesn't require repayment as it represents ownership in the company. Grants are non-repayable funds. Donation-based crowdfunding doesn't typically require repayment. The other options generally involve some form of repayment or redemption.
4	A,C,D,G Convertible debentures could attract investors without immediately diluting control. Equity-based crowdfunding can provide capital and create a supportive community. Grants are often available for clean energy innovations. Peer-to-peer loans might offer more flexible terms than traditional bank loans. Long-term bank loans might be hard to obtain for a startup. Ordinary shares would dilute control more than other options. Bonds are typically used by larger, established companies.
5 B and D	[X] B. Taxes are a primary source of finance for public sector organisations at all levels of government. [X] D. Intergovernmental transfers involve funds moving between different levels of government.
6 B	B) Diversification reduces unsystematic risk but cannot eliminate systematic risk.
7	The correct ranking from lowest to highest risk for the company would be: Retained earnings, Bank loan, Corporate bonds(debt), Preference shares (preferred shares) and Ordinary shares (common shares).
8 C	$E(Ri) = Rf + \beta i(Rm - Rf)$, Plugging in the values: $E(Ri) = 3\% + 1.5(10\% - 3\%)$ $E(Ri) = 13.5\%$
9 C	C) The M&M theory (without taxes) argues that firm value is independent of capital structure, while the traditional theory suggests an optimal debt-to-equity ratio exists.

10 B	Explanation: **Step 1: De-gear the beta** Asset Beta = Equity Beta / [1 + (1 - Tax Rate) × (Debt / Equity)] = 1.4 / [1 + (1 - 0.25) × 0.5] = 1.4 / 1.375 = 1.018 **Step 2: Re-gear the beta with the new debt-to-equity ratio** New Equity Beta = Asset Beta × [1 + (1 - Tax Rate) × (New Debt / Equity)] = 1.018 × [1 + (1 - 0.25) × 0.7] = 1.018 × 1.525 = 1.62
11 B,C,E	B. High operational gearing can lead to significant profit increases with a small rise in sales. C. Low operational gearing results in more stable profits across varying sales levels. E. Operational gearing measures the proportion of fixed costs relative to variable costs.
12 OG=4	Operational gearing= Contribution Margin / Operating Profit = FRW400,000 / FRW100,000 = 4

Back to Unit D questions

Unit E Answers

Question	Answers
1 B	We need to convert the 6-month demand to annual demand: Annual demand (D) = 5,000 * 2 = 10,000 units We need to calculate the annual holding cost per unit (H): H = 15% of £140 = £21 per unit per year EOQ = √ ((2 * 10,000 * 60) / 21) = 239 units
2 B	Opportunity cost
3 B	Profitability, liquidity, and capitalisation
4 B	To minimise total inventory costs
5 C	To optimise cash balances
6	a, b, d, e, f
7 **73 days**	**Calculating the components:** a) Inventory Turnover Period = (£1,500,000 / £7,500,000) × 365 = 73 days b) Receivables Collection Period = (£800,000 / £10,000,000) × 365 = 29.2 days c) Payables Deferral Period = (£600,000 / £7,500,000) × 365 = 29.2 days Calculating the Cash Operating Cycle: Cash Operating Cycle = 73 + 29.2 - 29.2 = 73 days
8 B	Implementing early settlement discounts
9	A, B, D, E, G
10 A	A) Cash is immediately transferred to marketable securities to bring the balance back to the target level

Back to Unit E questions

Unit F Answers

Question	Answers
1 B	B Semi Strong Efficiency
2 A	A bonus issue involves the company distributing additional shares to existing shareholders without charge. This process: Increases the number of outstanding shares Increases the share capital account Decreases the retained earnings or share premium account by the same amount Does not affect the company's total equity or market capitalisation Does not dilute existing shareholders' ownership percentages
3 B	A scrip dividend, also known as a stock dividend, gives shareholders the option to receive additional shares instead of a cash dividend. The key advantage represented by the correct answer (B) is that: It allows the company to retain cash within the business Shareholders still receive a form of dividend The company can maintain its dividend policy without depleting cash reserves
4 B	Allocative efficiency in financial markets refers to the optimal distribution of financial resources to their most valuable uses. This concept implies that: Capital is directed to the most productive or promising investment opportunities Resources are allocated in a way that maximises overall economic welfare The market facilitates the flow of capital from savers to the most efficient users of that capital
5 B	High profitability increases the ability to pay dividends, but prioritising debt repayment can have both positive and negative implications for shareholders.

6 C	The dividend irrelevance theory, developed by Modigliani and Miller, posits that in perfect capital markets: A company's dividend policy has no effect on its market value or shareholders' wealth The value of a firm is determined by its earning power and investment decisions, not by how it distributes earnings
7 B	The signalling effect of dividends refers to the idea that: Changes in dividend policy can be used by management to convey information about the company's future prospects to the market Dividend increases often signal management's confidence in future earnings and cash flows Dividend cuts may signal financial distress or lower future earnings expectations
8 C	The clientele effect suggests that: Different groups of investors (clienteles) are attracted to stocks with dividend policies that match their preferences
9 B	The theory suggests that; Investors prefer the certainty of dividend payments over the possibility of future capital gains A bird in the hand (dividends) is worth more than two in the bush (future capital gains)
10 B	Stable Dividend Policy

Financial Management: Essential Formulae and Tables

1. Essential Formulae

Profitability Ratios

- ROCE = Profit from operations (before interest and tax) / Capital employed

Debt Ratios

- Gearing = Value of debt / Value of equity (or debt + equity)
- Interest cover = Profit from operations / Interest

Liquidity Ratios

- Current ratio = Current assets / Current liabilities

Shareholder Investor Ratios

- Dividend yield = (Dividend per share / Share price) × 100
- Earnings per share (EPS) = (Profits after tax - preference dividend) / Number of ordinary shares
- Price to earnings ratio (P/E) = Share price / EPS

Working Capital Ratios

- Operating cycle = inventory holding period + receivable collection period – payables payment period
- Inventory holding period = (inventory/cost of sales) × 365
- Receivables collection period = (trade receivables/credit sales) × 365
- Payables payment period = (trade payables/credit purchases) × 365
- Sales to net working capital ratio = sales/net working capital (excl cash)

Cost of Capital Formulae

- Kd = I(1 - t)/P0
- Kp = d/p
- IRR = a% + [NPVa/(NPVa - NPVb) × (b% - a%)]
- Total shareholder return = (dividend gain + capital) / share price at start year
- EAC = NPV of costs / Annuity factor for life of the project
- Profitability index = Present value of cash inflows / Present value of cash outflows

2. Mathematical Tables

Present Value Table

Present value of £1, that is (1 + r)^-n

where r = interest rate; n = number of periods until payment or receipt.

Periods		Interest rates (r)								
(n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239
Periods		**Interest rates (r)**								
(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482

5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065

Annuity Table

Present value of an annuity of 1, ie [1-(1+r)^-n]/r Where r = discount rate; n = number of periods

Periods		**Interest rates (r)**								
(n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495

12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606
Periods		Interest rates (r)								
(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675

3. Formula Sheet

Economic Order Quantity

EOQ = √(2CO × D/CH)

Miller-Orr Model

- Return point = Lower limit + (1/3 × spread)
- Spread = 3√[3/4 × transaction cost × variance of cash flows / Interest rate]

The Capital Asset Pricing Model

E(ri) = Rf + **βi**(E(rm) - Rf)

The Asset Beta Formula

βa = [Ve/(Ve + Vd(1-T))**β**e] + [Vd(1-T)/(Ve + Vd(1-T))**βd**]

The Growth Model

P0 = D0(1 + g)/(re - g) re = [D0(1 + g)/P0] + g

Gordon's Growth Approximation

g = br

The Weighted Average Cost of Capital

WACC = [ve/(ve + vd)]ke + [vd/(ve + vd)]kd(1 - T)

Note: D0(1+g) may be replaced by D1

The Fisher Formula

(1 + i) = (1 + r)(1 + h)

Purchasing Power Parity and Interest Rate Parity

- S1 = S0 × (1 + hc)/(1 + hb)
- F0 = S0 × (1 + ic)/(1 + ib)

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Contact Us
Institute of Certified Public Accountants of Rwanda (ICPAR)
KG 686 ST, House #10, Kamutwa, Kacyiru
P.O. Box: 3213 Kigali
Tel: +250 784103930
Email: info@icparwanda.com
www.icparwanda.com