POLITEKNIK MALAYSIA
MERLIMAU

FINANCIAL
MANAGEMENT
1ST SERIES

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FINANCIAL MANAGEMENT
1ST SERIES

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PREFACE

This e-book is designed primarily for students who need clear understanding of financial management. It is one of the additional reference sources for all students who take Financial Management or who are interested in this topic.

The topics covered in this e-book include financial system and time value of money. Hopefully this e-book will help students and readers enhancing their knowledge and understanding in financial management.

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INTRODUCTION TO FINANCIAL MANAGEMENT

TOPIC 1

INTRODUCTION TO FINANCIAL MANAGEMENT

1.1 THE NATURE AND IMPORTANCE OF FINANCIAL MANAGEMENT

- Any business has important financial concerns, and its success or failure depends on the large part on the quality of its financial decisions.
- Every key decision made by a firm's manager has important financial implications.
- Financial activities; borrowing fund, buying a plant, expansion of product lines, issuing share or debenture.
- Finance may be defined as the art and the science of managing money.
- Financial management is principally concerned with making financial decisions that influence and affect the worth of a firm. It relates to creation and sustenance of the economic value of the firm.
- The goal is to create wealth and economic value of the firm, including its sustenance.
- It also covers the use of the best methods to evaluate various alternatives and make the best decisions thereon.

1.1.1 The Importance of Financial Management

- Financial management knowledge is important to a firm to answer the following questions:

  - ✓ What sort of fixed assets should a firm invest in?
  - ✓ How shall firms raise the necessary funding to finance the capital expenditure once a decision has been made as to the type of fixed asset or business opportunity to invest in?
  - ✓ How shall a firm manage its short-term operating cash flows?

Accounting Equation
Total assets (non-current assets + current assets) = Total liabilities (current + long term) + Shareholders' equity

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Non-Current Assets	Current Liabilities
- **Tangible assets**	**Non-Current Liabilities**
- **Intangible assets**	**Shareholder's Equity**
Current Assets	

Table 1.1 Statement of Financial Position of a firm

BOARD OF DIRECTORS

CHIEF EXECUTIVE OFFICER (CEO)

OTHER DEPARTMENTS

CHIEF FINANCIAL OFFICER (CFO)

Duties:
- Corporate strategic and financial planning
- Control firm cash flows
- Determine financial policy

OTHER DEPARTMENTS

TREASURER

Duties:
- Capital budgeting and expenditures
- Financial planning
- Sourcing and raising funds
- Cash management
- Credit management
- Management of foreign currencies
- Risk management

CONTROLLER (ACCOUNTS MANAGER)

Duties:
- Financial statements
- Cost and management accounting
- Firm taxes

Figure 1.1 Finance area in a firm

1.1.2 Role of Financial Manager
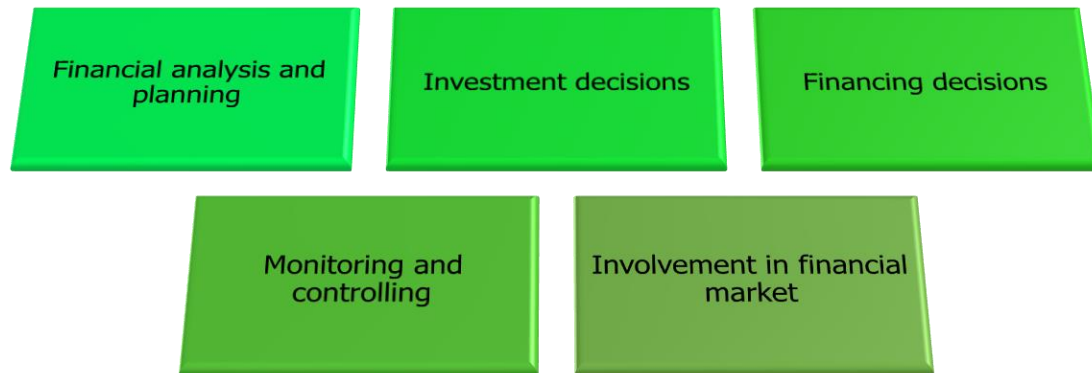
Figure 1.2 Role of financial manager

1. Financial Analysis and Planning

- Financial managers must be able to forecast the company's future performance
- Forecasting is made based on the company's past and present performance as well as other factors such as economic performance, customer preference and the future demand for their products.
- Perform financial planning—contribute in corporate planning and development of financial policy for the firm

2. Investment Decisions

- Determine sales growth rates
- Determine what specific assets to be purchased

3. Financing Decisions

- Determine the best method of financing those assets, whether to use debt or to use equity. It involves the determination of:
  - ✓ Appropriate mix of short-term and long-term source of funds for financing
  - ✓ Appropriate source of funds for specific investment in asset structure
  - ✓ Appropriate dividend policy to ensure the availability of internally generated funds for reinvestment.

4. Monitoring and Controlling

- Financial manager has to interact with other departments within the organization.
- Decisions of other departments might affect investment decisions.
- Example: Perform cost and management accounting roles (to provide regular management accounting information so that the planning and monitoring of daily and monthly activities can be performed)

5. Involvement in Financial Market

- Financial manager has to obtain financing either through the money market or capital market.
- Decide on investing excess or idle funds in the financial market.
- Foster relationships with creditors (bank loan officers), stockholders, investors, underwriters of equity & bond issuer, and governmental regulatory bodies.

Finance manager acts as an intermediary between the firm's operations and the financial markets. Some roles include capital budgeting & expenditures; corporate strategic & financial planning; sourcing and raising funds; cash management; credit management; management of foreign currencies
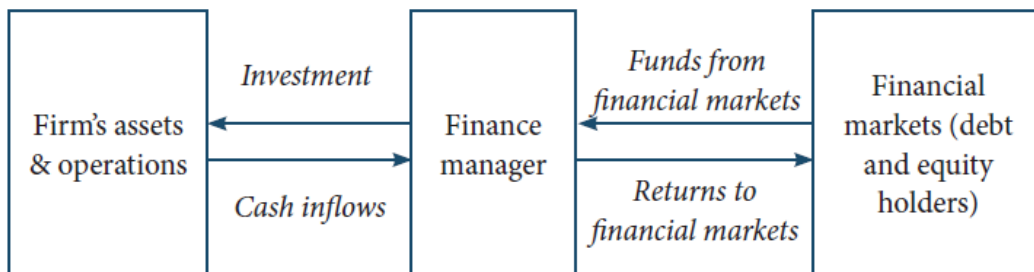
Figure 1.3 Finance manager as an intermediary

1.2   THE GOALS OF THE FIRM

1.2.1 To Maximize the Profits

- It is a single-period or short-term goal to be achieved within one year
- Stresses the efficient use of capital resources
- Financial manager might only implement actions that would result in maximum profits without considering the impact of his actions on the company's future performance.

1.2.2 To Maximize the Wealth of Shareholders

Practical Reason

- When making investment and financing decisions for the firm, decisions can be made much more simply and quickly. If the interests of other stakeholders were also to be considered, decisions may not be made quickly and efficiently.

Legal Reason

- Shareholders are the owners of the firm.
- Shareholders are protected by the provisions of the Companies Act, 2016.
- Finance managers owe some kind of allegiance to the 'owners' of the firm.
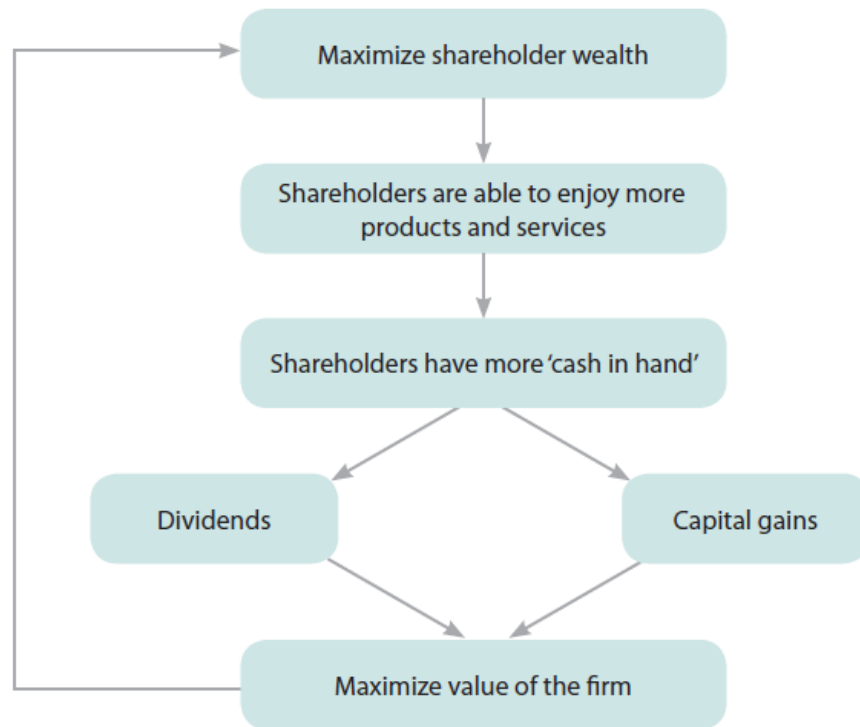
Figure 1.4 Shareholder wealth maximization

1.3 PRINCIPLES THAT FORM THE FOUNDATION OF FINANCE

1	Money has a time value
2	There is a risk-return trade-off
3	Cash flows are the source of value
4	Market prices reflect information
5	Individuals respond to incentive

1.3.1 Money Has a Time Value

- A dollar received today is more valuable than a dollar received in the future.
  We can invest the dollar received today to earn interest. Thus, in the future, you will have more than one dollar, as you will receive the interest on your investment plus your initial invested dollar.

1.3.2 There is a Risk-Return Trade-Off

- We only take risk when we expect to be compensated for the extra risk with additional return.
- The higher the risk, the higher the expected return will be.

1.3.3 Cash Flows are the Source of Value

- Profit is an accounting concept designed to measure a business's performance over an interval of time.
- Cash flow is the amount of cash that can actually be taken out of the business over this same interval.
- Financial decisions in a firm should consider "incremental cash flow" i.e. the difference between the cash flows the company will produce with the potential new investment it's thinking about making and what it would make without the investment

1.3.4 Market Prices Reflect Information

- Investors respond to new information by buying and selling their investments.
- The speed with which investors act and the way that prices respond to new information determines the efficiency of the market. In efficient markets like United States, this process occurs very quickly. As a result, it is hard to profit from trading investments on publicly released information.

1.3.5 Individuals Respond to Incentive

- Incentives motivate and the actions of managers are often motivated by self-interest, which may result in managers not acting in the best interest of the firm's owner. When this happens the firm's owner will lose value.
- Managers respond to the incentives they are given in the workplace and when their incentives are not properly aligned with those of the firm's stockholder, they may not make decision that are consistent with increasing shareholder value.

TOPIC 2
FINANCIAL SYSTEM
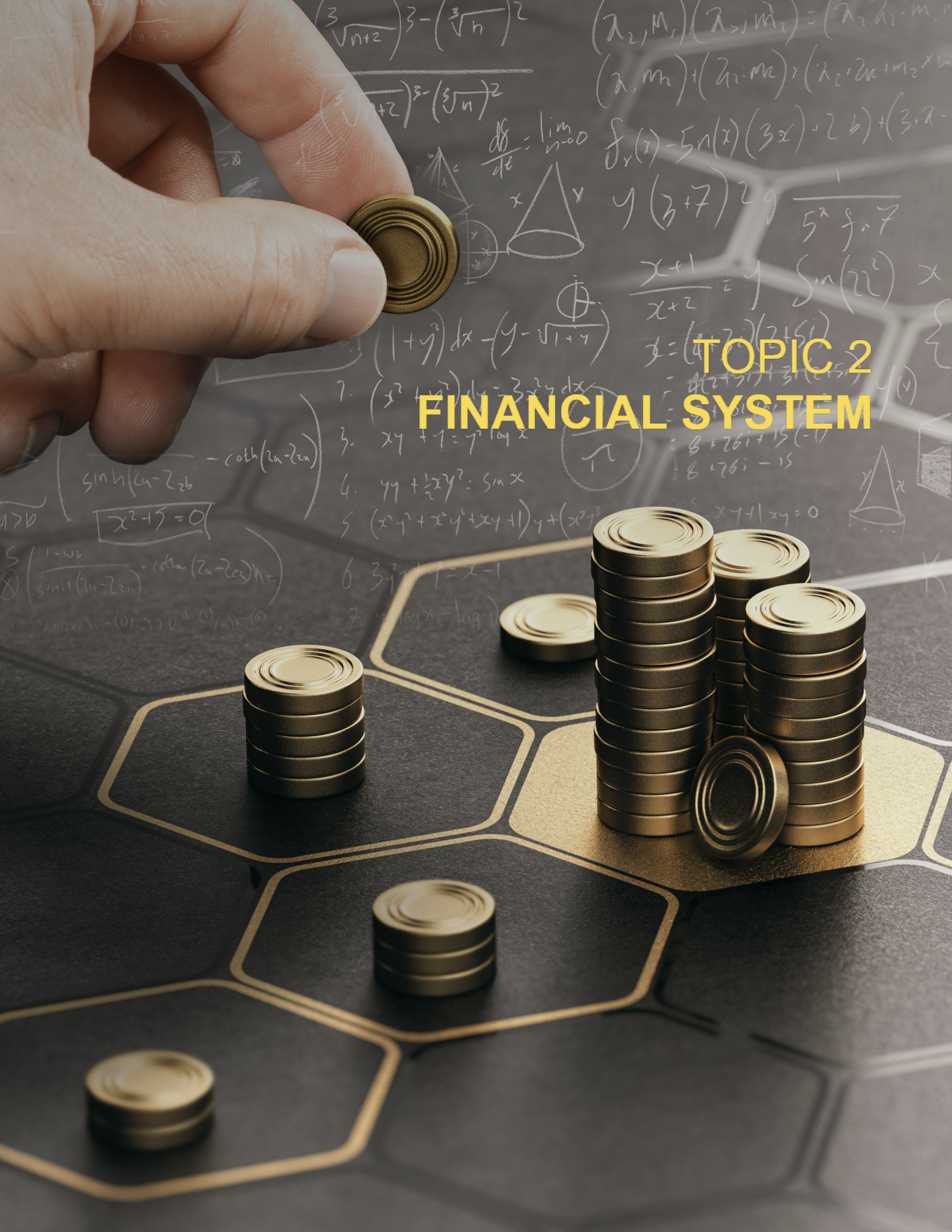
TOPIC 2

FINANCIAL SYSTEM

2.1   BANK AND FINANCIAL INSTITUTIONS

- Financial system is defined in economics and finance studies as a system that provides efficient flow of funds from saving to investment by bringing savers and borrowers together via financial market and financial institution
- The role of the financial system shall be to facilitate the flow and efficient allocation of funds from one group, being the 'surplus spending units' to the group that requires funds, being the 'deficit spending units', throughout a country's economy
- Banks are a ubiquitous and an indispensable feature of modern society. We deposit our money and use cheques for a lot of our transactions and also wire money to different places to make payments.
- Most people need to take loans to buy homes or make any large purchases.
- Most companies need loans to carry out expansion projects and to fund working capital.

2.1.1   Financial Intermediaries

- The function of a modern bank/financial system is to bring together a pool of money from the general public, make advances and earn an income from these advances.
- This function of borrowing money from one source to give it to another company

that needs funding, investment or resources is known as *financial intermediaries.*

- This function is done by entities besides banks, such as investment bank, hedge funds, private equity funds, mutual funds and insurance companies

- It may look risky to give one person's money to someone else while it is not being used. However, the truth is that this phenomenon is actually highly beneficial.

- This is so because new businesses that gain access to money make the economy grow and the money the banks earn from their lending operation keeps them in business, as well.

- Financial Intermediaries facilitate the transfer of capital and risk between borrowers and savers. The reasons financial intermediaries exist are:
  - ✓ enterprises or individuals that need the money (potential borrowers) hold better information about their financial condition and prospects than the people or organizations that have the money to lend (potential creditors)
  - ✓ the costs to match potential creditors and potential debtors without the services of a specialized third parties (i.e. financial intermediaries) are prohibitive

2.1.2 Types and Function of Financial Intermediaries

i. Commercial Banks

- Retail banking services such as the acceptance of deposit, granting loans and advances and financial guarantees

- Authorized to deal in foreign exchange and the only financial institutions allowed to provide current account facilities.

- Examples of commercial banks: Maybank, CIMB, Citibank, Am Bank, RHB Bank.

ii.   Investment Banks

- Responsible for stimulating a lot of activity in the market
- Provides an interface for trading equity shares, bonds and other financial instruments.
- Manage initial public offers and advise & execute mergers, acquisitions and divestures.
- Examples of investment banks: CIMB Investment Bank, Maybank Investment Bank, Am Investment Bank.

iii.   Finance Companies

- Provide financial services to business sectors and the household sectors.
- Businesses and individuals have identified finance companies as an intermediary that can provide funds for the acquisition of certain assets.
- The financial services include:
  (a) operating saving accounts
  (b) operating fixed deposits accounts
  (c) hire purchase financing
  (d) leasing financing
  (e) housing loans
  (f) personal & education loans
- Examples of finance companies: Am Finance Berhad, Maybank Finance

iv.   Islamic Banks

- The banking activities of Islamic Banks are based on Syariah principles
- Offering banking products based on the Islamic principles
- Examples: Bank Islam, Al Rajhi, Bank Muamalat, Kuwait Finance House.

2.1.3 Types and Functions of Non-Bank Financial Intermediaries

> **Non-Bank Financial Intermediaries**
>
> Non-Bank Financial Intermediaries (NBFIs) is a heterogeneous group of financial institutions other than commercial and co-operative banks.
>
> They include a wide variety of financial institutions, which raise funds from the public, directly or indirectly, to lend them to ultimate spenders.

i.   Development Financial Intermediaries
- Specialized institutions formed to promote and develop the industrial & agricultural sectors.
- Development Financial Intermediaries not only provide medium and long term financing but also technical and managerial assistance.
- Examples: Agro Bank, Bank Pembangunan & Infrastruktur Malaysia Berhad, Bank Industri& Teknologi Malaysia Berhad.

ii.   Saving Institutions
- Being set up to promote and mobilize savings among individuals especially from the lower income group.
- Also involved in the economic development by providing loans to selected borrowers.
- Examples: Bank Simpanan Nasional
- Main source of funds is from the deposits of customers.

iii. Employees Provident and Pension Funds

- Established to safeguard savings from members or contributors, and provide future benefits in the event of retirement, death or disabilities.
- These savings come from the monthly deduction of a certain percentage of member's monthly income & a certain percentage contributed by the employers.

iv. Insurance Companies (Including Takaful)

- Provide financial coverage to policyholders in the event of death or loss of property.
- In order to get the coverage, a sum of money (or premium) has to be paid by policy holders to the insurance companies.

v. Other Non-Bank Financial Intermediaries

- Other non-bank financial intermediaries are such as factoring companies, unit trust, leasing companies and credit assurance companies.

2.1.4 The Central Bank

- A central bank is responsible for the monetary policy of a country. In other words, its primary responsibility is to maintain the stability of the national currency and money supply and thus, control inflation.
- The more active duties of a central bank include acting as a lender of last resort to the banking sector. It also usually has supervisory powers, to ensure that banks and other financial institutions do not behave recklessly or fraudulently. Thus, it regulates the banking system.

- It is usually owned by the government of that country, but has a degree of autonomy in functioning.
- A central bank has two main kinds of functions:
  - ✓ macroeconomic (or related to the behaviour of national economy as a whole) when regulating inflation and price stability.
  - ✓ microeconomic (or related to the behaviour of individuals) when functioning as a lender of last resort, or when requiring banks to hold liquidity reserves.

The Role of Central Bank

A. To enforce applicable laws, codes and norms and take appropriate action in case of violation of such laws, codes and norms. The action taken typically includes prosecution, fines and suspension of license.

B. To formulate the required norms, codes of conduct, etc. for the sector. Besides the various laws that govern the country, there are other norms like appropriate disclosure and maintaining systems.

C. To license financial service providers. The purpose of licensing is to ensure that the institutions have the capability to carry out the activity they want to undertake.
The regulator needs to ensure that the player has qualified people, technological tools and also enough financial resources to carry out its function.

D. To maintain confidence in the financial system. If this confidence is lost, it is likely that people will go back to earlier practices of saving money by burying it, hoarding it or buying precious items like gold. The effect of such practices is that businesses will have little sources of capital and people will have limited options to invest their money. This will lead to lesser and lesser economic activity and thus lead to an economic depression.

2.2   FINANCIAL MARKETS

- A financial market is a market in which people and entities can trade financial securities, commodities and other fungible assets at prices that are determined by pure supply and demand principles
- Markets work by placing the two counterparts, buyers and sellers, at one place so they can find each other easily, thus facilitating the deal between them.
- Perform the essential and important economic function of channeling funds from the providers (households, other firms and government) that have surplus funds to those who have a shortage of funds (and hence, require funds).
- Financial markets bring these two groups together:
  (a) Providers of funds
  (b) Users of funds

2.2.1   Role of Financial Markets

- Facilitation of savings by individuals by allowing them to consume less today (savings) to be able to consume more in the future
- Platform to raise financing by the users (firms) of finance
- Channel whereby demand for and supply of funds can interact and arrive at a suitable market price for funds.
- Provision of financial services that allow participants to work out and balance their risk tolerance and expected returns

2.2.2 Types of Financial Markets

| Primary and Secondary Market |

| Debt, Equity and Derivative Market |

| Spot and Future Market |
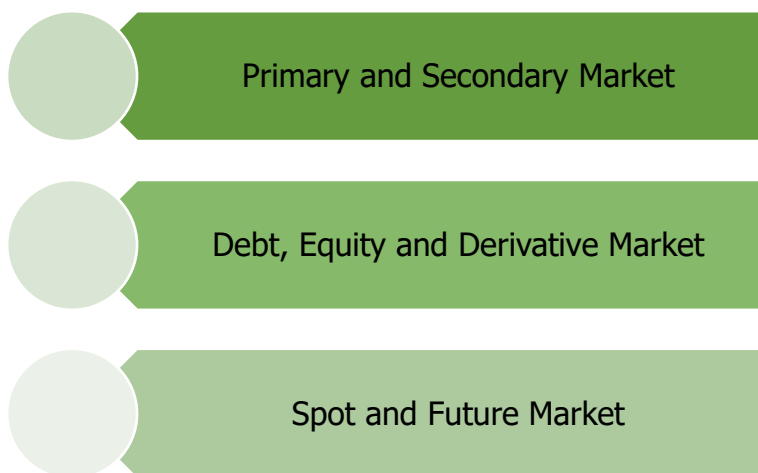
i. Primary and Secondary Market

- **Primary market** activities refer to the issue of new securities. These securities do not exist prior to such primary market activities.
- Funds are raised from providers of finance by firms that require such funds.
- Firms issue shares and debt instruments (bonds or loan stock) to providers of finance.
- Firms engage into two types of primary market activities - public offerings and private placements.
- Public offerings - issue of debt/equity securities to the public at large.
- Publish prospectuses and advertise in national newspapers, calling for subscriptions for the securities by the public.
- Issues underwritten by merchant banks, stockbroking companies or investment banks.
- Firms concerned would have to be listed with Bursa Malaysia.

- Private placements - firms may issue debt or equity to certain parties (and not to the public at large) after having undertaken private discussions and negotiations.
- Providers of finance under this category include pension funds, insurance firms, banks and selected individual investors.
- **Secondary market** activities on the other hand involved the trading of securities that are already in existence.
- Investors (providers of finance) buy and sell shares, bonds, loan stocks and so on.
- The trading of shares and bonds in an exchange is, therefore, considered as secondary market transactions.

ii. **Debt, Equity and Derivative Market**
- **Debt market** are markets where debt instruments are traded. They are borrowings either by the government or private institutions
- Example: treasury bills and bond, corporate bonds, commercial paper and repurchase agreements
- **Equity markets** are the market to trade equity. The most common one is the common stock of a company
- Other example: preferred stocks, real estate investment trust, investment funds and exchange traded funds
- **A derivative** is a financial instrument that is derived from other financial securities or some other underlying asset
- Examples of derivatives are forwards, futures, options and swaps
- **Forwards** - agreement to buy or sell an underlying asset at some time in the future, at a price agreed upon today. It may be tailor-made to suit the

participant's or investor's requirement

- **Futures** - agreement by the investors or participants to deliver or take delivery (buy or sell) an underlying asset sometime in the future at a price agreed upon today. Futures are standardised contracts and are typically traded through an exchange.

- **Options** - gives the holder the right but not the obligation, to buy or sell a fixed quantity of asset, at a pre-specified price, on or before a fixed future expiry date. A call option gives the holder the right to buy an asset whereas a put option gives the holder the right to sell an asset. The value of the option depends on the value of the underlying asset

- **Swaps** – an agreement to exchange a series of payments sometime in the future. For instance, in a fixed-for-floating interest rate swap, a firm may agree with another firm that one party would pay fixed interest and receive floating interest, whereas the other party would be the one to pay floating interest and receive fixed interest. Swaps involves two different currencies whereby one party pays in one currency and receives in the other currency, and vice versa.

iii. **Spot and Future Market**

- **Spot markets** are markets where buyers and sellers contract for the exchange of the assets to delivery immediately.

- **Future markets** are markets where the contracting date defers from the delivery date. The terms and conditions for the exchange are contracted at time t.

2.2.3   Money Markets

- Markets for debt securities that will be repaid in the short term (less than one year)
- Relates to a group of loosely connected markets, in particular dealer markets.
- Main player in the role as dealer is the banks; particularly active in this market, both as lenders and borrowers.
- Large firms lend when they have surplus cash (invest in Certificate of Deposits, Commercial Paper, Treasury Securities, Bankers' Acceptances, etc.) and borrow when they are short of money.

2.2.4   Capital Markets

- Markets for long-term debt (i.e. debt securities that will be repaid after more than one year) and equity.
- Long-term debt such as bonds, debentures or loan stocks, term loan, leasing and industrial hire purchase.
- Features: Contractual (legal) obligation to repay borrowings, involves interests and principal.

2.2.5   Money Market Instruments

- Instruments that have time to maturity of 1 year or shorter at the time of issuance
- These are called discount instruments as they do not make interim payment, either in the form of coupon payments or dividends.
- Investors will purchase the instrument at a discounted price (less than the par value).
- At maturity they will be paid at par and hence the return they earn will be the

different between the par and the price at which they bought the asset

- **Example**: An investor bought a 90day T-bill for RM950. In 90 days, the T-bill will mature and he will be paid the par of RM1000. Calculate the discount yield. Assume T 360 days

$$\text{Discount yield} = \frac{\text{par} - \text{price}}{\text{par}} \cdot \frac{T}{t}$$

T = number of days in a year

t = time to maturity of the T-bill

- **Solution:**

$$\text{Discount yield} = \frac{1000 - 950}{1000} \left[\frac{360}{90} \right]$$

$$= 20\%$$

The discount yield will be 20%. The investor receives an absolute return RM50, which is 5% of the par value of the T-bill. This 5% return is earned over a 3-month period, which translates to an annualized return of 20%.

FINANCIAL MANAGEMENT

2.3   ISLAMIC FINANCE SYSTEM

- The modern financial system is based on interest, which is forbidden in Shariah or Islamic Law.
- It may seem that a financial institution that is devoid of interest is devoid of a source of income.
- However, while Shariah may not allow for interest, it allows for other forms of remuneration like profit sharing and leasing.

2.3.1   Principles Used in Islamic Finance

- **Mudarabah** is a form of partnership where one of the contracting parties, the *rabb-al-mal* (the financier), provides a specified amount of capital and acts like a sleeping or dormant partner, while the other party, called the *mudarib* (entrepreneur), provides the entrepreneurship and management for carrying on any venture, with the objective of earning profits.
- **Musharakah** contract, is where the proportion of profit that needs to be distributed between the partners must be agreed upon at the time of agreeing to the contract. The proportion of the profit that is distributed must be according to the actual profit earned and not a fixed percentage of the capital invested.
- **Murabahah** is an asset based, commonly used for cost plus financing. Financier purchases the assets and resells it at a predetermined higher price to the individual or entity financed. The financier's margin is known to the user of capital. The user of capital pays the price plus markup over in instalments.
- **Commodity Murabahah or Tawarruq** is monetization of commodity. The entity needing finance buys a commodity from the financier which is then sold to a third

person on cash at a price less than the purchase price. Financing is obtained in cash without taking any interest being involved.

- **Takaful** is an Islamic insurance. *Takaful* is based on concepts of mutual cooperation, responsibility, protection and assistance between groups or participants. It is similar to co-operative scheme wherein members contribute sums of money to a pool. Losses are divided and liabilities spread according to the community pooling system.
- **Ijarah** is leasing or rent. The financier buys the asset and leases it for a fee. The total fee will cover the cost and a profit margin.
- **Istisna** is a manufacturing contract. Delivery of goods for up-front cash payment or deferred delivery and payment.
- **Sukuk** is an Islamic bond. *Sukuk* are tradable like conventional bonds. They are usually asset backed and represent proportionate beneficial ownership in the underlying asset. *Sukuks* can be based on principles of *Musyarakah, Ijarah* and so on.

2.3.2 Ethical Aspect in Islamic Finance

- **Freedom to Contract within Permitted Commodities/Activities**: Trade is considered to be permissible and legal, but contracts are not valid if it involves an element of coercion or force. Further exchange, trade and investment is permitted only when undertaken in permissible commodities or property or activities.
- **Freedom from Al-Riba**: While *riba* is commonly understood as interest, in Arabic it means 'to excess' or 'increase'. Aside from loans, all forms of contracts and transactions must be free from *riba*. As *riba* means 'excess', the prohibition of *riba* implies that there is no reward for time preference alone.

- **Freedom from *Al-Gharar***: Must be free from excessive *gharar* (or uncertainty). One of the implications is that one cannot trade in objects that are not in possession (i.e. selling things one has not bought, or pay-offs upon happening of some events that is difficult to predict.

- **Freedom from Price Manipulation**: Islam approves of a free market where prices are determined by forces of demand and supply. There should be no interference in the price formation process.

2.3.3   Progress of Islamic Finance Industry

Dubai Islamic Bank established under special law—pioneering Islamic banking in the region

Fiqh Council of the OIC declares *Takaful* as fully Islamic—paving the way for Islamic insurance to flourish

Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) established. The Institute acts as a nodal body advising on standards to be followed by Islamic institutions worldwide

IFSB introduces 'Standards' on Basel II compliance for Islamic institutions

The republic of Indonesia issued its first global *sukuk*

A flurry of *sukuk* issuance happens in the Middle East Notable issuers were Central Bank of Bahrain, Qatar, Central Bank and Emaar

First Islamic bank established in Egypt

Iran introduces 100% Islamic banking system

The world's first global sovereign *sukuk* by government of Malaysia

Total Islamic assests aggregate to USD300 billion, growing at the rate of 10–15% over past 10 years

Singapore launches its first *sukuk* programme

| 1963 | 1973 | 1975 | 1983 | 1984 | 1985 | 1989 | 1991 | 2001 | 2002 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |

Bank Islam Malaysia established

Malaysia passes comprehensive legislation on Islamic finance

Sudan's banking system becomes 100% Islamic

Islamic Financial Services Board (IFSB) established in Malaysia. The organization enhances stability of the industry by issuing standards

The world's first international subordinated *sukuk* by Maybank

Singapore's first Islamic real estate investment trust was listed

Islamic Development Bank (IDB) established to foster the economic development and social progress of member countries and Muslim communities. IDB participated in equity capital and grant loans for projects in member countries

Sudan launches Islamic banking

The world's first global corporate *sukuk* by Kumpulan Guthrie

The world's first exchangeable *sukuk* by Khazanah Nasional

Petronas capital and petronas global *sukuk* Ltd. issued the first currency denominated *sukuk*

TOPIC3
TIME VALUE OF MONEY

TOPIC 3

TIME VALUE OF MONEY

3.1 THE ROLE OF TIME VALUE OF MONEY IN FINANCE

- Finance and financial planning deal with the value of money over time.
- Managing funds, be it in the form of investment or borrowing over a specified period of time, is referred as time value of money.
- TVM involves future cash flows and financial mathematics.
- In finance, the focus is on economic gains and not accounting gains.
- The concept that money available today is worth more than the same amount of money in the future.
- This preference rests on the Time value of money.
- Thus, a money received today is worth more than a money received tomorrow, why?
- This is because that:
    - a money received today can be invested to earn interest
    - Due to money's potential to grow in value over time.
    - Because of this potential, money that's available in the present is considered more valuable than the same amount in the future
- Time value of money relates to the concept that a sum of money today is worth more than the same sum in the future.
    - Lenders' perspectives
    - Borrowers' perspectives
    - Interest rates
    - Periods

3.2 THE CONCEPT OF PRESENT VALUE AND FUTURE VALUE

Sources: https://pixabay.com/photos/dollars-currency-money-us-dollars

Would you prefer to have 1 million dollars now or 1 million dollars 10 years from now?

Of course, we would all prefer the money now!

This illustrates that there is an inherent monetary value attached to time.

3.3 TECHNIQUES IN CALCULATING TIME VALUE OF MONEY

Present value of single amount (PVIF)	**Future value of single amount (FVIF)**
Present value of interest factor annuity (PVIFA)	**Future value of interest factor annuity (FVIFA)**

3.3.1 Future Value of a Single Amount (FVIF)

- Future value utilizes the concept of compounding.

> **FV$_1$ = PV$_0$ + Interest payment**
>
> where:
>
> FV$_1$ is the future value at the end of the first period (year 1)
>
> PV$_0$ is the present value of the amount being saved or invested today

- **Example 1:** Using the above formula, suppose you deposit RM1,000.00 today and the bank offers a 7% interest rate per annum. If you plan to save your money for 3 years, determine the future value in Year 1, 2 & 3.

- **Solution:**

  Year 1: 1,000 + (1,000 x 0.07) = 1,000 + 70 = **1,070**

  Year 2: 1,070 + (1.070 + 0.07) = 1,070 + 74.90 = **1,144.90**

  Year 3: 1,144.90 + (1,144.90 x 0.07) = 1,144.90 + 80.14 = **1,225.04**

- **Using formula**:

> **FV$_n$ = PV$_0$ $(1 + r)^n$**
>
> where:
>
> FV$_n$ is the future value at the end of the period n (year n)
>
> PV$_0$ is the present value of the amount being saved or invested today
>
> r is the interest rate
>
> n is the number of periods

FINANCIAL MANAGEMENT

- **Using table FVIF:**

> **FVn = PV (FVIF r,n)**

- **Let's try this:**

Azrul has decided to place RM500, which he received as a birthday gift, in a savings account paying 4% interest. How much will accrue to Azrul's account in six years' time?

- **Solution:**

$FV_6 = PV (FVIF_{4\%, 6yrs})$ @ $FV_6 = PV (1 + r)^n$

$\quad = 500 (1.265)$ $\quad = 500 (1 + 0.04)^6$

$\quad = $ **RM632.50** $\quad = $ **RM632.66**

3.3.2 Compounding

- Frequency of calculating interest.
- Compounding (frequency of interest calculation) can be done:
    - annually (once a year)
    - semi-annually (twice a year)
    - quarterly (four times a year)
    - monthly (twelve times a year)
    - daily (365 times a year)
    - continuously (exponential)

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- Thus, some changes need to be made to the formula as below:

> **n = numbers of year x number of compounding periods in a year**

> **r = annual rate of interest / number of compounding periods in a year**

- **Example 2:**

  Use the same requirement as in example 1. Let us say the bank offers an 8% interest rate for any deposit but the frequency of compounding is semi-annual. Calculate the future value at the end of year 3.

- **Solution:**

  To do the calculation, the formula needs to be modified, as illustrated below. Please note that m is the number of compounding

  $$FV_n = PV_n \, (1 + r/m)^{\,n \times m}$$

  $$= 1{,}000 \, [1 + (0.08/2)]^{\,3 \times 2}$$

  $$= 1{,}000 \, (1.2653)$$

  $$= \textbf{RM 1,265.30}$$

3.3.3 Present Value of a Single Amount (PVIF)

- Present value is the current value of a given future cash flow.
- The present value tells us the amount of money needed today in order to obtain a desired amount after a period of time.
- **Using formula:**

$$PV_0 = FV / (1 + r)^n$$

- **Using table:**

$$PV_0 = FV (PVIF_{r,n})$$

- **Example 3:** Marry wishes to accumulate RM10,000 in her bank account in three years' time. She decides to invest her money in a three-year deposit account that pays an annual compounded rate of 6%. How much must she put into the account now to achieve her goal?

- **Solution:**

$PV_0 = FV / (1 + r)^n$ @ $PV_0 = FV (PVIF_{r, n})$

$= 10,000 / (1 + 0.06)^3$ $= 10,000 (PVIF_{6\%, 3})$

$= $ **RM 8,396.31** $= 10,000 (0.8396)$

$= $ **RM 8,396.00**

- **Let's try this:**

  What will the present value be of RM1,000 to be received eight years from today if the discount rate is 5%?

- **Solutions:**

  $PV_0 = FV \times (PVIF_{r, n})$ @ $PV_0 = FV / (1 + r)^n$

      $= 1000 \, (PVIF_{5\%, 8})$ $= 1000 / (1 + 0.05)^8$

      $= 1000 \, (0.677)$ $= 1000 / 1.477$

      $= $ **RM 677** $= $ **RM 677**

3.3.4 Annuities

- An annuity is a series of equal payments made at fixed intervals for a specified number of periods.
- An annuity is a series of equal payments made at fixed intervals for a specified number of periods.
- There are 2 types of annuities:
  - Ordinary annuity
  - Annuity due
- Each payment of an *ordinary annuity* refers to the **payment at the end of the period**
- The payment of an *annuity-due* refers to a **payment period starting beginning of the period**
- Figure below illustrates the two types of annuities.

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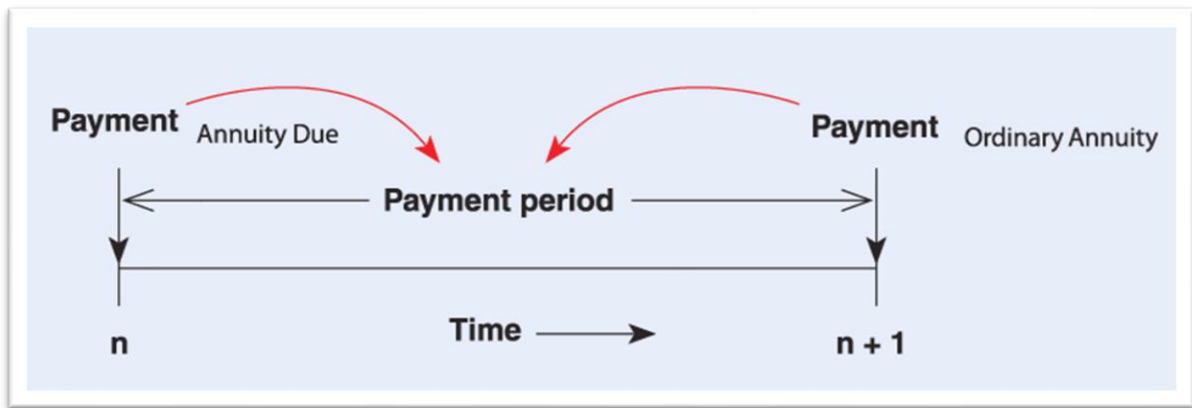
3.3.5   Present Value of an Ordinary Annuity

- The present value of each payment must be calculated by dividing each by 1 plus the discount rate raised to the power of the number of periods involved.
- **Using formula:**

$$PV_0 = FV_1 / (1 + r)^1 + FV_2 / (1 + r)^2 + \ldots\ldots FV_n / (1 + r)^n$$

- **Using table PVIFA:**

$$PV_0 = PMT \times (PVIFA_{r, n})$$

- Suppose we want to find the present value of RM50 received every year for three years at a discount rate of 7%.
- The calculation is shown in figure 3.1
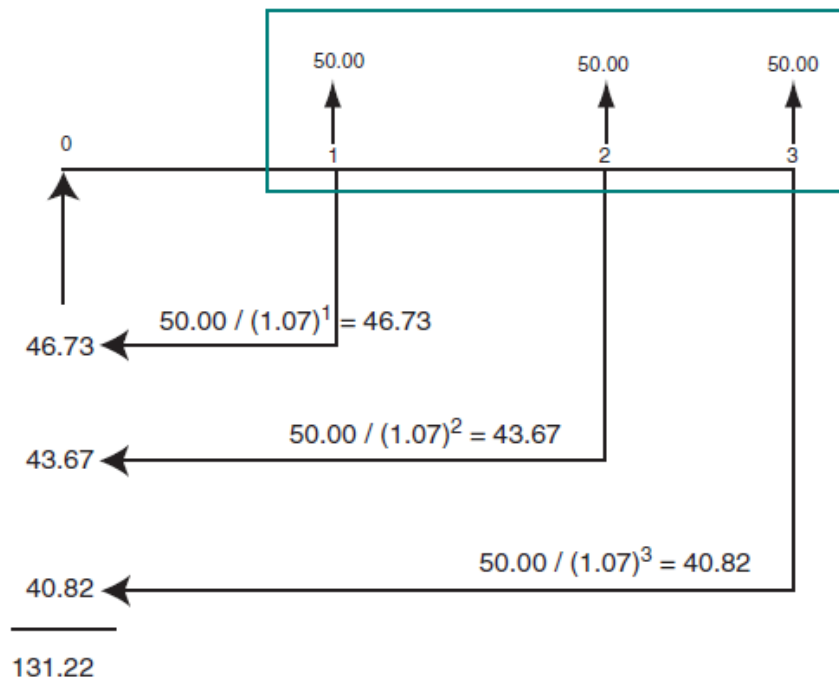
Figure 3.1: Calculation of the present value of an ordinary annuity

- **Example 4**: Amy has won a jackpot which pays her RM5,000 per year for three years beginning one year from today. Amy wants to know the present value of the jackpot using a discount rate of 7%.

- **Solution (using formula)**:

$$PV_0 = FV_1 / (1 + r)^1 + FV_2 / (1 + r)^2 + FV_3 / (1 + r)^3$$

$$= 5{,}000 / (1 + 0.07)^1 + 5{,}000 / (1 + 0.07)^2 + 5{,}000 / (1 + 0.07)^3$$

$$= 4{,}672.90 + 4{,}367.19 + 4{,}081.49$$

$$= \textbf{RM } \textbf{13,121.58}$$

- **Solution (using table)**:

PV0 = PMT x (PVIFA r, n)

= PMT x (PVIFA 7%,3)

= 5,000 (2.624)

= **RM13,120**

- **Let's try this:**

What is the present value of a 5-year RM1,000 annuity discounted back to the present at 10%?

3.3.6   Present Value of an Annuity Due

- The annuities are often paid with the first payment starting at the beginning of the year- starting immediately at year 0. This type of annuity is called an *annuity due.*
- **Using formula:**

$$PV_A = PMT \times [(1/r \times (1 - 1/(1 + r)^n))] (1 + r)$$

- **Using table:**

$$PV_A = PMT \times (PVIFA_{r, n}) (1 + r)$$

- A sum of RM50 is paid every year for three years but the first payment starts immediately.
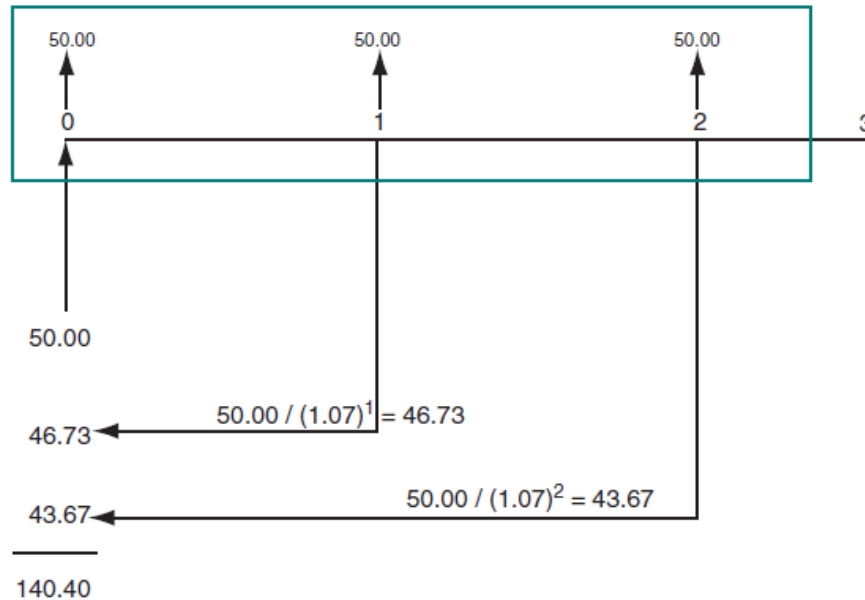- The details are shown in the figure 3.2

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Figure 3.2: Calculation of the present value of an annuity due

- **Example 5**: Raj has won a RM 1 million jackpot and will get paid in five annual payments where the first payment will be made immediately, then followed by four more payments over a period of five years. If Raj's opportunity cost is 8% what is the present value of his jackpot?

- **Solution**: First, we must calculate the size of the annual payment, which is RM 1 million divided by 5 or RM200,000 for each payment.

  PVA = PMT x (PVIFA $_{r, n}$) (1+ r)

      = 200,000 x (PVIFA $_{8\%,5}$) (1 + 0.08)

      = 200,000 x 3.9927 x 1.08

      = **RM862,423.20**

- **Let's try this:**

  What is the present value of a 4-year RM1,000 annuity discounted back to the present at 9%?

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3.3.7   Present Value of a Perpetuity

- Receipts or payments of equal periodic cash flows are to be made untill infinity or forever is called a *perpetuity.*
- **Formula:**

> **PV = PMT / r**

- **Example 6**: Roslan has invested in a special government bond that provides income on investment of RM100 per annum in perpetuity. Determine the present value of this perpetual annuity if you are told that the time value of money is 8% per annum
- **Solution:**

PV = PMT / r

     = 100 / 0.08

     = **RM1,250**

3.3.8   Future Value of An Ordinary Annuity

- The future value of an annuity refers to the amount that we will accumulate by making regular payments at a given interest rate over a specified period of time.
- Figure 3.3 shows how the future value is determined using an interest rate of 9% and the yearly payment is RM25.
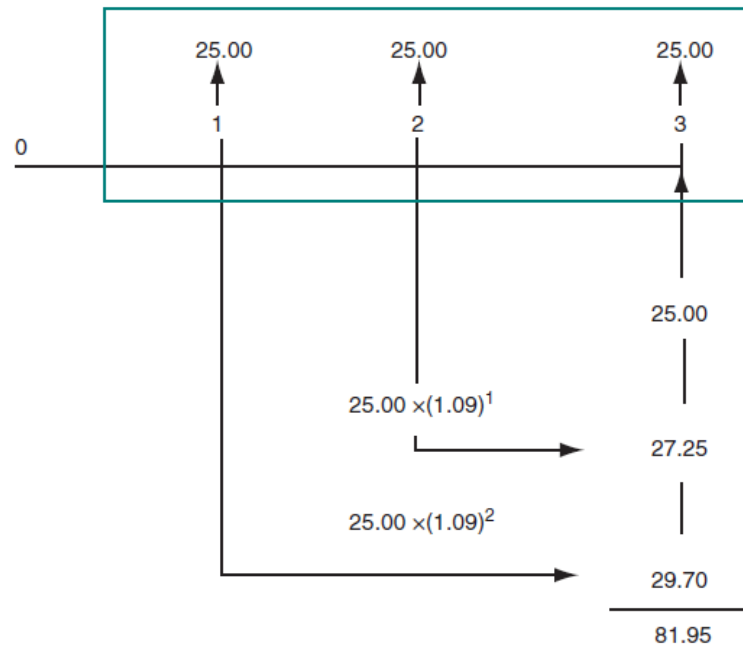
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Figure 3.3: Computation of the future value of an ordinary annuity

- **Using formula:**

$$FVA = PMT \times \frac{(1 + r)^n - 1}{r}$$

- **Using table:**

$$FVA = PMT \, (FVIFA_{r, n})$$

- **Example:** Bakri plans to put aside RM5,000 per year so that he can make a nice down payment on a BMW car in six years' time. If he makes the payments at the end of each year and earns 8% on his deposits, how much will he have accumulated at the end of six years?

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- **Solution (Using formula):**

$$FVA = PMT \times \frac{(1 + r)^n - 1}{r}$$

$$= 5{,}000 \times \frac{(1 + 0.08)^6 - 1}{0.08}$$

$$= \textbf{RM36,679.64}$$

- **Solution (using table):**

$$FVA = PMT\ (PVIFA_{r,\ n})$$

$$= PMT\ (PVIFA_{8\%,\ 6})$$

$$= 5{,}000\ (7.3359)$$

$$= \textbf{RM36,679.50}$$

3.3.9   Future Value of An Annuity Due

- Payments are to begin immediately, NOT at the end of the first period, we must therefore calculate the future value of an annuity due.
- As the last payment is made at the beginning of the last period, the entire future value of the annuity earns an extra year's interest by the end of the last period.
- Similar to the present value of an annuity calculation, to calculate the future value – multiply the future value of the annuity by 1 plus the interest rate.
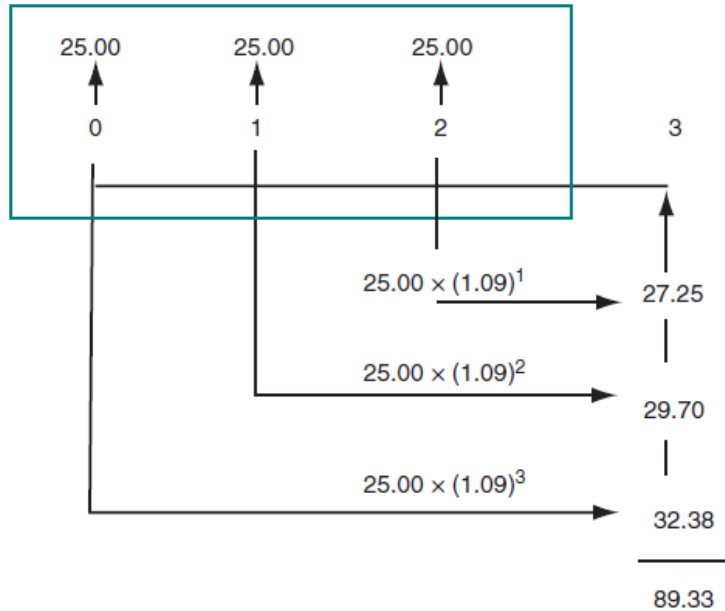- Refer to the figure 3.4 for the example.

Figure 3.4: Computation of the future value of an annuity due

- **Using formula:**

$$FVA = PMT \times \left[\frac{(1 + r)^n - 1}{r}\right](1+r)$$

- **Using table:**

$$FVA = PMT \ (FVIFA_{r, n}) \ (1 + r)$$

- **Example 7**: We are using similar facts as in example 6. However, we are told that Bakri plans to put aside RM5,000 per year starting now and still earns 8% on his deposits, how much will he have accumulated at the end of six years?

- **Solution (using formula)**:

$$FVA = PMT \times \frac{(1 + r)^n - 1}{r} (1 + r)$$

$$= 5,000 \times \frac{(1 + 0.08)^6}{0.08} (1 + 0.08)$$

$$= RM39,614.02$$

- **Solution (using table)**:

$$FVA = PMT (PVIFA_{r, n}) (1 + r)$$

$$= PMT \times (FVIFA_{0.08\%, 6}) (1 + 0.08)$$

$$= 5,000 \times 7,3359 \times 1.08$$

$$= RM39,613.86$$

3.4 EFFECTIVE ANNUAL RATE (EAR)

- Effective annual rate (EAR)—the rate has a very significant impact on the calculation of the time value of money but also on daily business activities
- The contractual annual interest rate that uses for calculating the future value or present value can also be called the *nominal rate.*
- EAR is the equivalent annual rate after adjusting for the frequency of compounding that occurs within a year.
- It is used to compare the annual interest between loans with different compounding terms (daily, monthly, annually or other).
- The formula to calculate EAR:

$$\textbf{EAR} = (1 + n/m)^m - 1$$

- **Example:** Assume the nominal rate offered by 2 banks is 8%. Bank 1 offers a semi-annual compounded rate (m=2) while Bank 2 offers a quarterly compounded rate (m=4). Note that as the number of compounding increases, the EAR also marginally improves.

- **Solution:**

EAR Bank 1 $= 1 + (0.08/2)^2 - 1$

$\qquad\qquad = \mathbf{8.16\%}$

EAR Bank 2 $= 1 + (0.08/4)^4 - 1$

$\qquad\qquad = \mathbf{8.24\%}$

3.5　ANNUAL PERCENTAGE RATE (APR) & ANNUAL PERCENTAGE YIELD (APY)

3.5.1　Annual Percentage Rate (APR)

- Annual percentage rate (APR) refers to the rate obtained by multiplying the periodic short-term rate (e.g. semi-annually, quarterly, monthly, etc.) by the number of periods in a year.

- It is a rate that is stated in annual terms.

- **Example**: Suppose a bank is charging its credit card holders 1.2% on a monthly basis, thus, in a year, the calculation will be:

- **Solution:**

APR $= 1.2 \times 12$

$\qquad = \mathbf{14.4\%}.$

3.5.2   Annual Percentage Yield (APY)

- APY is the effective rate that can be obtained from a savings account or an investment on an annual basis, after converting the periodic short-term rate to a annual equivalent rate.
- **Formula:**

$$APY = (1 + r)^m - 1$$

- **Example**: We receive a 1.2% return per month from our savings account
- **Solutions**:

$APY = (1 + 0.012)^{12} - 1$

$\quad\quad = \mathbf{15.39\%}$

PRACTICE EXERCISE

QUESTION 1

What is the present value of the following future amounts?
  a. RM800 to be received 10 years from now discounted back to present at 10%
  b. RM400 to be received 6 years from now discounted back to present at 6%
  c. RM1,000 to be received 8 years from now discounted back to present at 5%
  d. RM900 to be received 9 years from now discounted back to present at 20%

QUESTION 2

What is the present value of the following annuities?
  a. RM3,000 a year for 10 years discounted back to the present at 8%
  b. RM50 a year for 3 years discounted back to the present at 3%
  c. RM280 a year for 8 years discounted back to the present at 7%
  d. RM600 a year for 10 years discounted back to the present at 10%

QUESTION 3

Trish, who recently sold her Proton, placed RM20,000 in a saving account paying annual compound interest of 7%. Calculate the amount of money that will have accrued if she leaves the money in the bank for 1, 5, and 15 years.

QUESTION 4

A total of 10,000 copies of a new marketing book had been sold this year and were expected to increase by 15% per year. How much sales is expected each year for the next three years?

QUESTION 5

The Shin Corporation is planning to issue bonds that pay no interest but can be converted into RM1,000 at maturity, 8 years from their purchase. To price these bonds competitively with other bonds of equal risk, it is determined that they should yield 9%, compounded annually. At what price should the Shin Corporation sell these bonds?

QUESTION 6

What is the present value of the following?
    a. A RM400 perpetuity discounted back to the present at 9%
    b. A RM1,500 perpetuity discounted back to the present at 13%
    c. A RM150 perpetuity discounted back to the present at 10%
    d. A RM100 perpetuity discounted back to the present at 6%

QUESTION 7

You would like to have RM75,000 in 15 years. To accumulate this amount, you plan to deposit each year an equal sum in the bank, which will earn 8% interest compounded annually. Your first payment will be made at the end of the year.
    a. How much must you deposit annually to accumulate this amount?
    b. If you decide to make a lump-sum deposit today instead of the annual deposits, how large should this lump-sum deposit be? (Assume you can earn 8% on this deposit)

QUESTION 8

In 10 years, you plan to retire and buy a house in Alor Gajah, Melaka. The house you are looking at currently costs RM125,00 and is expected to increase in value each year at a rate of 5%. Assuming you can earn 10% annually on your investment, identify how much must you invest at the end of each of the next 10 years to be able to buy your dreams home when you retire.

TUTORIAL EXERCISE

QUESTION 1

Count the present value of a RM10,000 perpetuity discounted at 8%.

QUESTION 2

Fatima had decided to invest RM1,000 for 2 years in a saving account paying 6% interest compounded semi- annually. Calculate the future of Fatima's investment.

QUESTION 3

Aisya will receive a mixed stream of cash flows from an investment over the next 5 years:

YEAR	CASH FLOWS (RM)
1	5,000
2	6,500
3	4,500
4	5,200
5	5,800

Calculate the initial amount that Aisya should invest, if the required return is 10%.

QUESTION 4

Calculate the future value of a 12-year annuity payment of RM2,000 per year paid at the end of each year at a rate of 8%. If the payment is made at the beginning of the year, recalculate the future value.

QUESTION 5

To buy a new house, you must borrow RM250,000. To do this, you take out a RM250,000, 30-year, 9% mortgage. Your mortgage payments, which are made at the end of each year (one payment each year), include both principal and 9% interest on the declining balance. Analyze how large will your annual payment be.

QUESTION 6

You have RM9,000 to deposit. ABC Bank offer RM 12 percent per year compounded monthly, while King Bank offers RM 12 percent but will only compound annually. How much will your investment be worth in 10 years at each bank?

QUESTION 7

Mr. Naeem has won a scholarship which pays him RM5,000 per year for 3 year beginning a year from today. He wants to know the present value of the scholarship using a discount rate of 7%. Solve this by using Factor Formula.

QUESTION 8

If you put RM100 in the market at the end of every year for 20 years at 10%, how much would you end up with? What if you put the RM100 in at the beginning of every year?

QUESTION 9

Mr. Khaild will receive RM8,500 a year for the next 15 years from her trust. If a 7 percent interest rate is applied, what is the current value of the future payments if first receipt occurs today?

QUESTION 10

An annuity makes 25 annual payments of RM1,000 with the first payment coming today. What is the future value of this as of 25 years from now if the interest rate is 9%?

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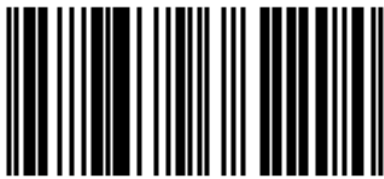
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