

Understanding South African **Financial Markets**

Chapter 9: Financial market terminology, technicalities and theories



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Study outcomes

The objective of this chapter is to explain the trading concepts, terminology, conventions, mathematical and theoretical foundations that are required to better understand the South African financial markets.

When you have studied this chapter you should

- be able to distinguish among the various types of financial market
- understand the securities trading process and its terminology and conventions
- know why clearing and settlement are vital in a well-functioning financial system



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Study outcomes

- know the various day count, annual basis and settlement conventions
- be familiar with concepts such as bids, offers, spreads, long versus short positions, spot versus forward markets, scrip dematerialisation, and others
- be able to discuss the different types of participant in the financial markets
- understand basic interest rate conventions and calculations
- be familiar with the time value of money concepts and calculations, and be able to apply them
- know the innovative financial market theories that have guided financial thought and decision making over the last 50 years.

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Introduction

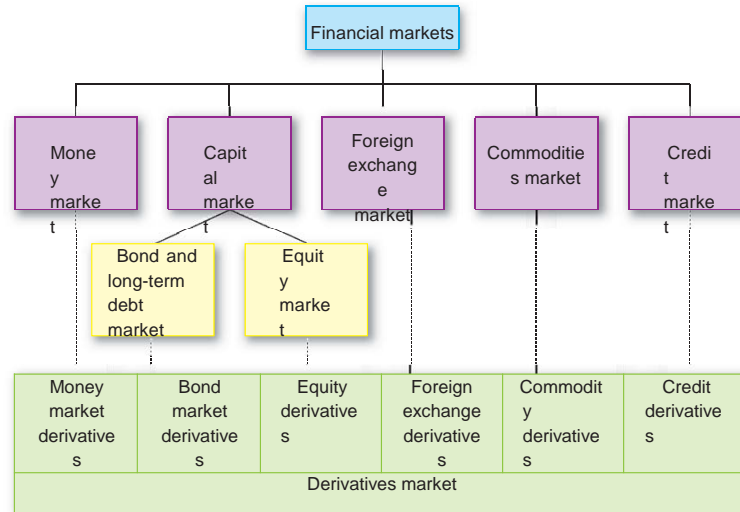
Overview

- Types of financial market
- Financial market terminology
- Financial market participants
- Mechanics of trading
- Mechanics of clearing and settlement
- The time value of money and its applications
- Term structure of interest rates
- Financial market theories

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Types of financial market

Figure 9.1 The financial markets covered in this book (Textbook page 201)



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Types of financial market

Spot and forward markets

Primary and secondary markets

Exchanges and over-the-counter markets

[Table 9.1 Difference between over-the-counter and exchange-traded markets](#)
(Textbook page 203)

Liquidity

- Dark pools

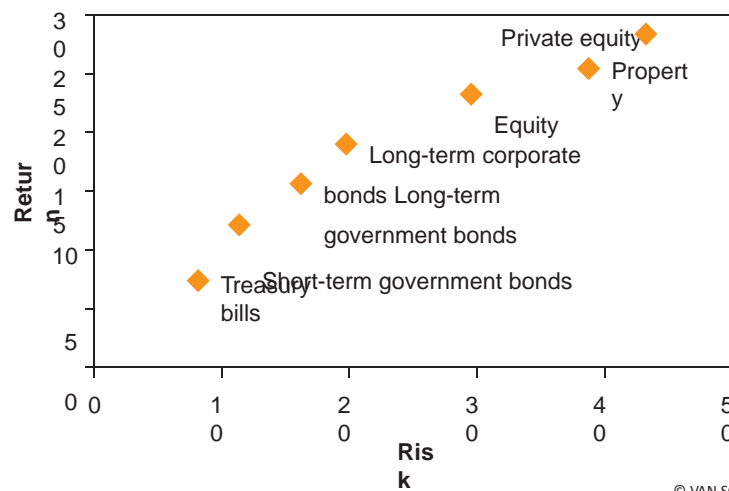
Interbank markets

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Financial market terminology

Risk and return

Figure 9.2 Risk and return of investments (Textbook page 205)



Financial market terminology

Risk and return

- **Measures of value**
 - Par value
 - Market value
 - Book value
 - Fair (or economic or intrinsic) value
- **Measures of return**
 - Yield
 - Required rate of return
 - Holding period return [\(F.9.1\)](#)
 - Comparing HPRs for different holding periods [\(F.9.2\)](#)
 - Other measures of return
- **Measures of risk**

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Financial market participants

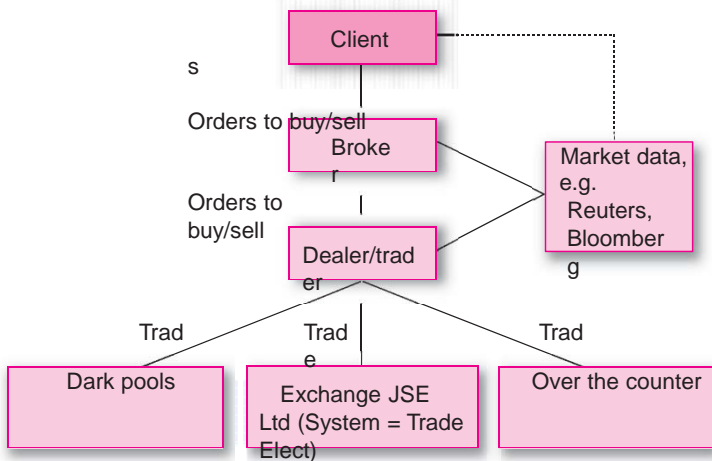


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Mechanics of trading

The trading process

Figure 9.3 The trading process (Textbook page 210)



```

    graph TD
      Client[Client] -.-> MD[Market data, e.g. Reuters, Bloomberg]
      Client -- "Orders to buy/sell" --> Broker[Broker]
      Broker -- "Orders to buy/sell" --> Dealer[Dealer/trader]
      Dealer -- "Trade" --> DP[Dark pools]
      Dealer -- "Trade" --> Exchange["Exchange JSE Ltd (System = Trade Elect)"]
      Dealer -- "Trade" --> OTC[Over the counter]
      MD -.-> Dealer
  
```

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Information providers

- Reuters
- Bloomberg

Trading terminology

- Day count and annual basis conventions

[Table 9.2 International day count conventions](#)

- A note on the *ACT/360* convention

[F.9.3](#)

[F.9.4](#)

- Settlement or value date
- Price quotations and spreads
- Short and long positions
- Trading versus banking book

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Mechanics of clearing and settlement

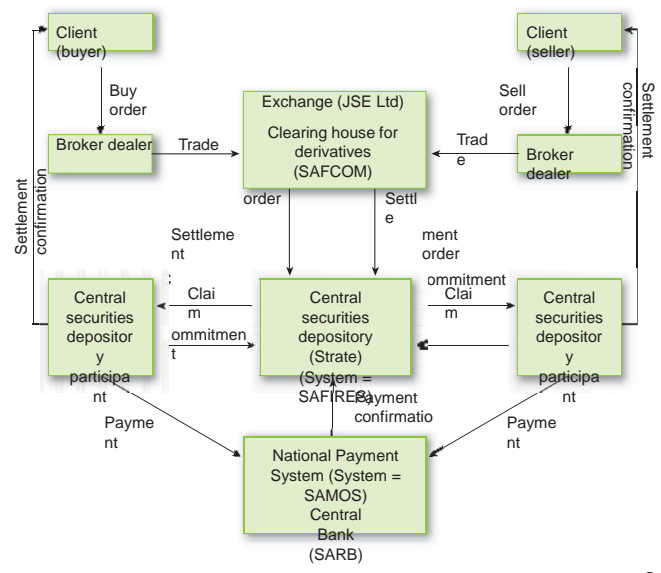
Concepts

- Immobilisation and dematerialisation of financial securities
- Settlement and custody of securities
- Central securities depository – Strate
- Central securities depository participants
- The National Payment System
- SWIFT

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The clearing and settlement process

Figure 9.4 The clearing and settlement process (Textbook page 217)



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Settlement conventions

Table 9.3 South African settlement day conventions (Textbook page 218)

| Market | Settlement convention (for spot transactions) |
|--------------------------------------|---|
| Listed bonds | T+3 |
| Money market (except Treasury bills) | T+0 |
| Treasury bills | T+3 |
| Listed shares | T+5 |
| Foreign exchange | T+2 |

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The time value of money and its applications

Interest calculations

- **Simple interest**
 - Add-on instruments [\(F.9.5\); \(F.9.6\)](#)
 - Determining the simple interest annual rate of return [\(F.9.7\); Box 9.1](#)
 - Discount instruments [\(F.9.8\); \(F.9.9\)](#)
- **What is the difference between discount and interest?**
 - [F.9.10](#)
 - [F.9.11](#)

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The time value of money and its applications

Interest calculations

- **Compound interest**
 - Determining the future value [\(F.9.12\)](#)

Table 9.4 Compound interest calculations (Textbook page 223)

| PV | NAR | | Period | n (years) | f (frequency) | Calculation | FV |
|-------|-------|------|--------|--------------|------------------|--|------------------|
| R5000 | 8,00% | NACA | 3 yrs | 3 | 1 | $5000 \times (1 + 0,08)^{1 \times 3}$ | R6 298,56 |
| R5000 | 8,00% | NACS | 3 yrs | 3 | 2 | $5000 \times (1 + 0,08/2)^{2 \times 3}$ | R6 326,60 |
| R5000 | 8,00% | NACQ | 3 yrs | 3 | 4 | $5000 \times (1 + 0,08/4)^{4 \times 3}$ | R6 341,21 |
| R5000 | 8,00% | NACM | 3 yrs | 3 | 12 | $5000 \times (1 + 0,08/12)^{12 \times 3}$ | R6 351,19 |
| R5000 | 8,00% | NACM | 3 m | 1/4 | 12 | $5000 \times (1 + 0,08/12)^{12 \times 0,25}$ | R5 100,67 |
| R5000 | 8,00% | NACQ | 6 m | 1/2 | 4 | $5000 \times (1 + 0,08/4)^{4 \times 0,5}$ | R5 202,00 |
| R5000 | 8,00% | NACQ | 9 m | 3/4 | 4 | $5000 \times (1 + 0,08/12)^{4 \times 0,75}$ | R5 306,04 |
| R5000 | 8,00% | NACS | 9 m | 3/4 | 2 | $5000 \times (1 + 0,08/12)^{2 \times 0,75}$ | R5 302,98 |

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The time value of money and its applications

Interest calculations

Compound interest

- Determining the present value from future value – discounting [\(F.9.13\)](#)
- Determining the annual rate of return [\(F.9.14\)](#)
- Nominal versus effective interest rates [\(F.9.15\)](#)
- Annualising of returns
- Using the CAGR to smooth the volatility of periodic returns over a number of years
- From effective to nominal [\(F.9.16\)](#)
- Continuous compounding [\(F.9.17\)](#); [\(F.9.18\)](#)
- A note on compounding in South Africa

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The time value of money and its applications

Annuities

- Future value of an annuity [\(F.9.19\)](#); [\(F.9.20\)](#); [\(F.9.21\)](#)
 - Future value of a growing annuity [\(F.9.21\)](#); [\(F.9.22\)](#)
- Present value of an annuity [\(F.9.23\)](#); [\(F.9.24\)](#)
- Present value of a growing annuity [\(F.9.25\)](#); [\(F.9.26\)](#)
- Perpetuities [\(F.9.27\)](#)
 - Present value of a growing perpetuity [\(F.9.28\)](#)
- Determining the other variables in annuity formulas [\(F.9.29\)](#)

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The time value of money and its applications

Annuities

- Present and future values of unequal cash flows

Table 9.5 Future values of unequal cash flows (Textbook page 234)

| Time t (Year t) | Cash flow | Calculation | Future value at the end of t = 5 (year 5) |
|---|-----------|------------------------------|--|
| 1 | 1 000 | $1\,000 \times (1 + 0,08)^4$ | 1 360,49 |
| 2 | 2 000 | $2\,000 \times (1 + 0,08)^3$ | 2 519,42 |
| 3 | 4 000 | $4\,000 \times (1 + 0,08)^2$ | 4 665,60 |
| 4 | 5 000 | $5\,000 \times (1 + 0,08)^1$ | 5 400,00 |
| 5 | 6 000 | $6\,000 \times (1 + 0,08)^0$ | 6 000,00 |
| Total future value of cash flows | | | 19 945,51 |

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The time value of money and its applications

*Annuities**Table 9.6 Present value of unequal cash flows (Textbook page 234)*

| Time t (Year t) | Cash flow | Calculation | Present value at time t = 0 |
|--|-----------|-------------------------|--------------------------------|
| 1 | 1 000 | $1\,000 / (1 + 0,08)^1$ | 925,93 |
| 2 | 2 000 | $2\,000 / (1 + 0,08)^2$ | 1 714,68 |
| 3 | 4 000 | $4\,000 / (1 + 0,08)^3$ | 3 175,33 |
| 4 | 5 000 | $5\,000 / (1 + 0,08)^4$ | 3 675,15 |
| 5 | 6 000 | $6\,000 / (1 + 0,08)^5$ | 4 083,50 |
| Total present value of cash flows | | | 13 574,58 |

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- Net present value (NPV)

Table 9.7 NPV of a property investment (Textbook page 235)

| Time t | Cash flow | Calculation | PV with i = 10% | PV with i = 10,5385802970305% |
|--------|-----------|--------------------|-----------------|-------------------------------|
| 0 | -80 000 | $-80\,000/(1+i)^0$ | -80 000,00 | -80 000,00 |
| 1 | -500 | $-500/(1+i)^1$ | -454,55 | -452,33 |
| 2 | 4 500 | $4\,500/(1+i)^2$ | 3 719,01 | 3 682,86 |
| 3 | 5 500 | $5\,500/(1+i)^3$ | 4 132,23 | 4 072,12 |
| 4 | 4 500 | $4\,500/(1+i)^4$ | 3 073,56 | 3 014,10 |
| 5 | 115 000 | $115\,000/(1+i)^5$ | 71 405,95 | 69 683,25 |
| NPV | | | 1 876,21 | 0 |

- NPV of a bond ([F.9.30](#))
- Internal rate of return ([F.9.31](#))

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Term structure of interest rates

Yield to maturity

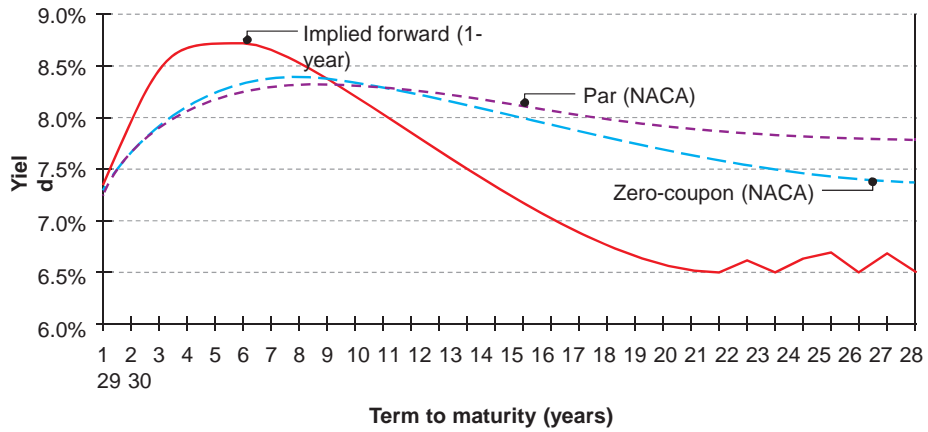
Par yield

Zero-coupon rate

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Implied forward rate

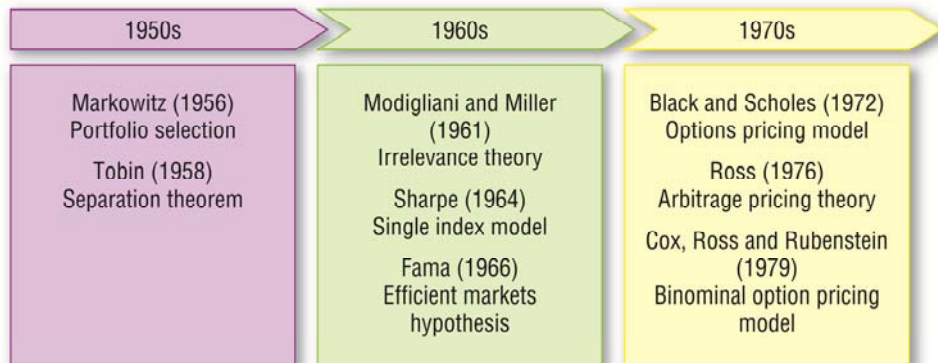
Figure 9.5 Par, zero-coupon and implied forward yield curves (Textbook page 238)



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Financial market theories

Figure 9.6 Timeline of major financial market theories (Textbook page 239)



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Markowitz: portfolio selection

Tobin: separation theorem

Modigliani and Miller: irrelevance theory

Sharpe: single index model

Fama: efficient markets hypothesis

Black and Scholes: option pricing model

Cox, Ross and Rubinstein: binomial option pricing model

Ross: arbitrage pricing theory

Behavioural finance