Investigate and monitor the financial aspects of issues.
Before we start...

Dear Learner - This Learner Guide contains all the information to acquire all the knowledge and skills leading to the unit standard:

| Title: Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues. | US No: 7468 | NQF Level: 4 | Credits: 2 |

The full unit standard will be handed to you by your facilitator. Please read the unit standard at your own time. Whilst reading the unit standard, make a note of your questions and aspects that you do not understand, and discuss it with your facilitator.

This unit standard is one of the building blocks in the qualifications listed below. Please mark the qualification you are currently doing:

<table>
<thead>
<tr>
<th>Title</th>
<th>ID Number</th>
<th>NQF Level</th>
<th>Credits</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Certificate in Animal Production</td>
<td>48979</td>
<td>4</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>National Certificate in Plant Production</td>
<td>49009</td>
<td>4</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

Please mark the learning program you are enrolled in:

- Learnership?
- Skills Program?
- Short Course?

This Learner Guide contains all the information, and more, as well as the activities that you will be expected to do during the course of your study. Please keep the activities that you have completed and include it in your Portfolio of Evidence. Your PoE will be required during your final assessment.

What is assessment all about?

You will be assessed during the course of your study. This is called formative assessment. You will also be assessed on completion of this unit standard. This is called summative assessment. Before your assessment, your assessor will discuss the unit standard with you.

Assessment takes place at different intervals of the learning process and includes various activities. Some activities will be done before the commencement of the program whilst others will be done during programme delivery and other after completion of the program.

The assessment experience should be user friendly, transparent and fair. Should you feel that you have been treated unfairly, you have the right to appeal. Please ask your facilitator about the appeals process and make your own notes.
Your activities must be handed in from time to time on request of the facilitator for the following purposes:

♦ The activities that follow are designed to help you gain the skills, knowledge and attitudes that you need in order to become competent in this learning module.

♦ It is important that you complete all the activities, as directed in the learner guide and at the time indicated by the facilitator.

♦ It is important that you ask questions and participate as much as possible in order to play an active roll in reaching competence.

♦ When you have completed all the activities hand this in to the assessor who will mark it and guide you in areas where additional learning might be required.

♦ You should not move on to the next step in the assessment process until this step is completed, marked and you have received feedback from the assessor.

♦ Sources of information to complete these activities should be identified by your facilitator.

♦ Please note that all completed activities, tasks and other items on which you were assessed must be kept in good order as it becomes part of your Portfolio of Evidence for final assessment.

Enjoy this learning experience!
How to use this guide …

Throughout this guide, you will come across certain re-occurring “boxes”. These boxes each represent a certain aspect of the learning process, containing information, which would help you with the identification and understanding of these aspects. The following is a list of these boxes and what they represent:

**What does it mean?** Each learning field is characterized by unique terms and definitions – it is important to know and use these terms and definitions correctly. These terms and definitions are highlighted throughout the guide in this manner.

You will be requested to complete activities, which could be group activities, or individual activities. Please remember to complete the activities, as the facilitator will assess it and these will become part of your portfolio of evidence. Activities, whether group or individual activities, will be described in this box.

**Examples** of certain concepts or principles to help you contextualise them easier, will be shown in this box.

The following box indicates a summary of concepts that we have covered, and offers you an opportunity to ask questions to your facilitator if you are still feeling unsure of the concepts listed.

**My Notes …**

You can use this box to jot down questions you might have, words that you do not understand, instructions given by the facilitator or explanations given by the facilitator or any other remarks that will help you to understand the work better.
What are we going to learn?

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SAQA Unit Standard
What will I be able to do?

When you have achieved this unit standard, you will be able to:

- This unit standard will be useful to people who aim to achieve recognition at some level in Further Education and Training or to meet the Fundamental requirement of a wide range of qualifications registered on the National Qualifications Framework.
- People credited with this unit standard are able to:
  - Use mathematics to plan and control financial instruments including insurance and assurance, unit trusts, stock exchange dealings, options, futures and bonds
  - Use simple and compound interest to make sense of and define a variety of situations including mortgage loans, hire purchase, present values, annuities and sinking funds
  - Investigate various aspects of costs and revenue including marginal costs, marginal revenue and optimisation of profit
  - Use mathematics to debate aspects of the national and global economy, including tax, productivity and the equitable distribution of resources.

What do I need to know?

It is expected of the learner attempting this unit standard to demonstrate competence against the unit standard:

- The credit value is based on the assumption that people starting to learn towards this unit standard are competent in Mathematics and Communications at NQF level 3.
1. **Budgets and other financial concepts**

After completing this session, you should be able to:
SO 1: Use mathematics to plan and control financial instruments.

In this session we explore the following concepts:
- What is a budget?
- The budgeting process
- Terminology and definitions associated with financial situations

### 1.1 What is a budget?

So what exactly is ‘budgeting’? It may be defined quite simply as ‘the process of compiling budgets and subsequently adhering to them as closely as possible’. To begin with, it is sensible to take an introductory look at this whole process, putting it into its overall context within a firm. To do this properly, you need to consider the different types of budget that are composed, the advantages and disadvantages of budgeting and the budgetary procedures which are followed by many organisations.

The role of planning is to create approved future policies for a company over a given period of time. The purpose of these policies is to enable the company to achieve its objectives. Plans do not have to be expressed in financial terms, for example, a personnel department may develop plans in terms of employee conditions or recruitment policies.

A budget is a plan expressed in financial terms. Budgets can vary in size from a personal budget developed for an individual, to the total annual budget produced by the government for the whole country.

The difference between a forecast and a budget is that a forecast is a prediction of what will happen in a particular situation – it can be a judgement by any competent person – whereas a budget is a target that a business aims to achieve. Moreover, when approved and issued, a budget is a directive to employees to work to achieve the business objectives.

Budgeting relies on the basic control factors used in cost accounting, as these form the major measures to be influenced when managing and controlling the business in the future.
A more precise definition of a budget might therefore be:

**A budget** A financial or quantitative statement, prepared in advance of a period of time, reflecting the agreed policies and strategies necessary to meet objectives.

We should all be familiar with the idea of a budget. Few of us embark on any large personal spending project without estimating what it will cost – even if we don’t write it down. If, for instance, we are planning to take a holiday, we are likely to spend some time considering where, when, and how we are going to go. Included in this will be an estimate of what it is likely to cost us, so that we can arrange the appropriate funding.

Furthermore, if half way through the holiday we find that we have spent more than we planned, we may have to alter our spending pattern to stay within our total limit. Or alternatively, make arrangements for extra money to be available!

Company budgetary control follows along very much the same lines, the main steps of the process being:

1. Definition of objectives
2. Allocation of responsibilities for achievement of objectives
3. Statement of policies and strategies necessary to achieve the objectives
4. Budget preparation – calculation of likely results
5. Budget approval
6. Implementation of policies and strategies
7. Measurement of progress – actual performance versus budget
8. Revision of policy to reflect actual conditions and new circumstances.

Before going into the process of preparing budgets, it is worth spending a little time considering how the whole planning and budgeting process fits into a company structure.

**The planning process**

There are several different approaches a farmer can use in planning for the future. The approaches are normally distinguished by the length of time covered, and can therefore be categorized as:

- Long-term plans
- Medium-term plans
- Short-term plans.
So, what is meant by these terms?

There is no universal definition of the time span covered by each of these categories. However, the long- and medium-term plans may be known as corporate or strategic plans. The use of such plans depends on a number of factors including:

♦ The type of business
♦ The markets served by the business
♦ The need for decisions regarding future events and products
♦ The importance placed by management on planning as a management tool.

The purpose of each type of process is as follows:

Long-term planning is an exercise aimed at assessing future socio-economic and business trends for periods of up to twenty years. It is important to be aware of these trends in order to determine strategies which will sustain company growth and meet corporate objectives in the long term.

Long-term planning assumes a more specific role in areas such as the aerospace industry, where product lead times may be as long as five to ten years. It is important to assess whether the market will still exist when the product finally emerges. However, in the micro-computer software industry, the rate of change is so rapid that long-term plans are likely to add little benefit to management decision making. In agriculture, long-term planning plays a key role. It is a very expensive exercise to change from one type of farming to another. You need to be very sure that the crop you have selected will have a market in a few years time, especially when you plan to go into something that takes a long time to grow like trees.

Medium-term planning is a more practical exercise and normally has a time horizon of two to five years. It is more practical because the closer we are to the present day, the fewer assumptions have to be made, and the probability of the plan reflecting what actually happens is much greater.

The medium-term plan will reflect the outline strategies developed in the long-term plan, but concentrate on the major decisions necessary in the next two to five years. These decisions will include areas such as: product life cycles (the need for new and replacement products), utilization of premises, development of manpower and so on.

Short-term planning or budgeting normally covers a period of a year, and, unlike the others, may be subject to revision within that year. Because it deals with the immediate future, it is subject to much more certainty and can provide a detailed statement of intent. Short-term plans are therefore produced in much more detail than the others.
The relationship between the planning processes follows below:

### The relationship between the planning processes

- **Analysis of socio-economic trend forecasts**
- **Predictions on the future of the industry**
- **Likely moves by competitors**
- **Internal strengths and weaknesses**
- **Define company policy**
- **Set profit and other financial objectives**

#### Long-term planning

- Prepare plans based on policies applied to existing operations
- Compare with objectives
- Develop alternative actions to overcome plan shortfalls against objectives
- Set short-term profit and other targets and objectives
- Prepare detailed budgets leading to a master budget

#### Medium-term planning

- Measure actual activity
- Analyze variations from plan
- Complete the feedback loop

#### Short-term planning or budgets

1.2 **The budgeting process**

In some companies, the budget is merely an annual document produced by the accountants without reference to the operational managers who will have to implement it. Because, in such cases, managers are not involved in the preparation of the budget, they are unlikely to be committed to fulfilling it. This results in copies
of the budget lying ignored on managers’ shelves gathering dust, with the budget playing no real part in business management.

Alternatively, the budget can represent a blueprint for management action and the future development of the business. As such, it is constantly referred to by managers and becomes central to business growth. So what are the qualities necessary that make the budget part of the management process? What is your view? Write your answer below:

_____________________________________________________________________
_____________________________________________________________________

Now compare the views contained in your answer with the points raised in the text below.

The budgeting process must demonstrate a number of features in order for it to achieve its full use. First of all, it must be relevant to each manager concerned. To do this, it must be available at departmental, product, or process level. It must also portray the planned activity accurately. In some cases, budgets need to be flexible order to take account of changed circumstances during the budget period.

Commitment to the process can be best obtained by making each manager responsible for preparing his own budgets. The budgets prepared should be based on company objectives and set realistic targets. They must be subject to senior management approval. Senior managers can then use the budget as a control document to monitor progress against the agreed actions.

In most cases, the budget process comprises a series of small budgets produced by department or process as appropriate. These small budgets are then consolidated to produce the overall company budget or master budget.

The budgeting process involves a series of consecutive events - the process cannot commence until the policy for future development is agreed - so the process itself needs to be planned. A flow chart of the major elements in a typical budgeting process is shown in the next page.

**The elements of planning applied to budgeting**

<table>
<thead>
<tr>
<th>Goal</th>
<th>To predict organization outputs, costs, and needs from other organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;What&quot; and &quot;How&quot;</td>
<td>Defining the organization’s work: inputs, activities, outputs, output dictators, and cost drivers Planning continuous performance improvement</td>
</tr>
<tr>
<td>&quot;When&quot; and Milestones</td>
<td>Schedules of inputs, activities, and outputs</td>
</tr>
<tr>
<td>&quot;How Much&quot;</td>
<td>Costs and needs from other organizations</td>
</tr>
<tr>
<td>&quot;Why&quot;</td>
<td>Justification of activities and costs</td>
</tr>
<tr>
<td>Assumptions</td>
<td>Explicit budgeting assumptions</td>
</tr>
<tr>
<td>Contingency Plans</td>
<td>Generally implicit – part of getting the budget approved</td>
</tr>
</tbody>
</table>
The budgetary procedures, which take place within businesses, will vary from one organisation to another. However, most firms will follow a similar series of steps, as highlighted in Figure 1.
1.3 Terminology and definitions associated with financial situations

- **Assurance**
  Assurance is a term interchangeable with insurance, but generally used in connection with life business as assurance implies the certainty of an event and insurance the probability. The term "assurance" is used more commonly in Great Britain and South Africa. Assurance (insurance) is a contract whereby one party, the assured/insured, in return for a consideration, called the premium, agrees to pay to the other party, called the assured/insured, a sum of money or its equivalent in kind upon the happening of a specified event that is contrary to the interest of the insured. More simply, assurance is a contract to pay a specified amount on the happening of a specified event.

- **Insurance**
  A contract whereby one party, the insurer, in return for a consideration, the premium, undertakes to pay the other party, the insured, a sum of money or its equivalent in kind upon the happening of a specified event that is contrary to the interest of the insured (contingency). A means whereby the losses of the 'few' are distributed among the 'many'.

- **Annuity**
  An annuity is a contract that provides a regular payment – typically monthly – during the lifetime of the annuitant – or a fixed period if less. If the payments start at the outset of the contract, it is an immediate annuity. If they start at some point in the future, it is a deferred annuity. The annuity can be on more than one life and the amount payable may increase.

- **Arbitrage**
  Trading strategies designed to profit from price differences for the same or similar goods in different markets. Historically the term implied little or no risk in trade, but more recently it has come to suggest some risk of loss or uncertainty about total profits.

- **Bond**
  Also known as Gilts. An investment usually issued by the government, which offer fixed half-yearly payments for a specific number of years, and a predetermined capital payment at the end of that period. Bonds are bought and sold in the bond market. Bond prices vary with the interest rate.
Gilt

A financial instrument through which the government borrows money from the public in exchange for a fixed repayment plan. A bond issued by the government or semi-government institutions.

Exchange rate

The price at which one country’s currency can be converted into another currency. If one US Dollar can be bought in South Africa for R6.00, this is the Rand/US Dollar exchange rate.

Futures contract

The contract trades on a futures exchange and is subject to a daily valuation ("marking to market") and settlement procedure. Upon expiry, settlement may result in the physical delivery of the underlying instrument, or simply cash.

Inflation

Inflation is the average rate at which prices (of products and services) increase over time. It gradually reduces the value of money for example, a loaf of bread, which cost 50c ten years ago, today costs R3. Increase in the general price level of goods and services generally measured by the consumer price index CPIX.

Option

An investment contract in terms of which one party has the option to trade in an investment on or before an agreed date at an agreed price. An option is a contract between two parties (a buyer and a seller) that gives the buyer the right, but not the obligation, to purchase or sell something at a later date at a price agreed upon today.

Present value

The current value of one or more future cash payments, discounted at some appropriate interest rate.

Stock exchange

A stock exchange is similar to an auction – buyers bid, sellers make offers and the shares are then sold at the price agreed on between the two.

Please complete Activity 1:

Answer the following questions:

a. Define a budget.
b. What are the steps to be followed for company budgetary control?
c. Why is it advisable to start with a sales-, then a production- and then a capital expenditure forecast in the budgeting process?
d. What is the difference between assurance and insurance?
e. What is an annuity?
f. What is a bond?
g. What is inflation?
Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues.

Primary Agriculture

<table>
<thead>
<tr>
<th>Concept (SO 1)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plans are sufficient to ensure effective control of financial instruments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calculations are carried out using computational tools efficiently and correctly and solutions obtained are verified in terms of the context.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measures used for control purposes are appropriate to the need and are in line with control plans.</td>
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My Notes ...

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Use mathematics to plan and control financial instruments.

After completing this session, you should be able to:

SO 2: Use simple and compound interest to make sense of and define a variety of situations.

In this session we explore the following concepts:

- Interest rates
- History of interest
- Types of compounding
- Types of interest rate
- Analysis of interest rate risks
- Effective interest rate
- Time value of money
- Annuity
- Futures
- Asset classes
- Investing in bonds
- Investing in shares
- Pooled investments
- RAs versus Endowments
- How much should you be saving towards retirement?

2.1 Interest rates

An interest rate is the 'rental' price of money. When a resource or asset is borrowed, the borrower pays the lender for the use of it. The interest rate is the price paid for the use of money for a period of time. One type of interest rate is the yield on a bond.

When money is loaned the lender defers consumption (or other use of the money) for a specific period of time. The lender does this in exchange for an expected increase in future income. The expected increase in real income (relative to the amount loaned) is the real interest rate. Note that the real interest rate is calculated by adjusting the actual rate charged (known as the money or nominal interest rate) to take inflation into account. (See real vs. nominal in economics.) A first approximation for the real interest rate for a one-year loan is:

\[ i_r = i_n - p^\phi \]
where:
\[ i_n = \text{nominal interest rate} \]
\[ i_r = \text{real interest rate} \]
\[ p^o = \text{expected or projected inflation over the year.} \]

After the fact, there is the realized or \textit{ex post} real interest rate:
\[ i_r = i_n - p \]

where \( p \) = the actual inflation rate over the year.

Thus, if the (expected) inflation rate is 5% and the nominal interest rate is 7%, the (expected) real interest rate is 2%.

If financial markets have adjusted for the effects of expected inflation and the real interest rate is given, then the nominal rate approximately equals:
\[ i_r + p^o \]

Thus, if the real interest rate is 3% and the inflation rate equals 5%, the nominal interest rate = 8%. The theory of rational expectations is sometimes applied to say that this equation applies in most cases. Most economists would agree that it applies over several years, as financial markets adjust: higher inflation leads to higher nominal rates, all else being equal.

In finance, interest has three general definitions.

- Interest is a surcharge on the repayment of debt (borrowed money).
- Interest is the return derived from an investment.
- Interest is the right to claim in a corporation such as that of an owner or creditor.

This article covers the first definition listed above.

Economists sometimes refer to interest as rent on money. As with any rental, the market price (or rate) is subject to change to reflect market conditions. The fraction by which the balances grow is called the interest rate. The original balance is called the principal. Interest rates are very closely watched market indicators, and have a dramatic effect on finance and economics.

The fact that lenders demand interest for loans in capitalist countries can be attributed to the following reasons:

2.2 \textbf{History of interest}

The collection of interest was forbidden by Christian and other religions under laws of usury. This is still the case with Islam, which results in a special type of Islamic banking. Gesell researched the destabilizing effect of interest (an asset will increase
beyond any limit over time) in his Freiwirtschaft theory, which includes negative interest rates.

Depending on the source, Albert Einstein referred to compound interest as the eighth's wonder of the world, the human race's greatest invention, or the most powerful force of the universe.

2.3 Types of compounding

The method by which interest accumulates generally falls in one of the following two categories:

- **Simple interest**

  Simple interest is the method in which outstanding balances grow linearly with time. In each period, the total balance grows by some fraction of the principal (that is, of the original investment).

  Simple interest is seldom used in practice, mostly for estimating compound interest in short durations. In most cases, this is because the interest earned in previous periods is assumed to remain in the account. Only when the interest earned is immediately withdrawn from the account should simple interest be used. When interest is not collected as it is accrued (as with a certificate of deposit, where the payment is in a lump sum), the interest increases the amount of money subject to interest. In this case, simple interest would not reflect the opportunity cost that the lender experiences.

  \[
  \text{Interest} = \text{Principal} \times \text{Rate of Interest per period} \times \text{Number of years or fraction of one year}.
  \]

  \[
  I = Prn
  \]

Calculate the interest on R600 at 7.5% for 10 months.

Before you start any interest calculation, always write down the information that you already have:

<table>
<thead>
<tr>
<th>Information</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I = ?</td>
<td>I = Prn</td>
</tr>
<tr>
<td>P = 600</td>
<td>= 600(0.075)(10/12)</td>
</tr>
<tr>
<td>r = 7,5% = 7,5/100 = 0,075</td>
<td>= R37.50</td>
</tr>
<tr>
<td>n = 10 months = 10/12 of a year</td>
<td></td>
</tr>
</tbody>
</table>

The total amount of money that you have at the end is called the accrued amount (A). Obviously the accrued amount is the money that you invested plus the interest earned, i.e.

\[
A = P + I
\]

Or

\[
A = P + Prn
\]
### Compound interest

Compound interest is the method in which outstanding balances grow exponentially with time. In each period, the total balance grows by some fraction of the sum of the principal and the interest paid on all previous periods.

With compound interest, the frequency of compounding influences the total amount of interest paid over the life of the loan. The accumulation function for compound interest is an exponential function in terms of time.

Suppose you invest a principal of $P$ at an interest rate of $r$ (given as a decimal) per year. Consider what happens when interest is compounded.

At the end of year 1, the interest earned will be $Pr$ which will be added onto the original principal of $P$ to give $P + Pr = P(1 + r)$.

At the start of year 2 we start with $P(1 + r)$. By the end of year two this too will become multiplied by $1 + r$ to give $P(1 + r)(1 + r) = P(1 + r)^2$.

The general formula for the value at the end of the $n$th year of principal of $P$, invested at an interest rate of $r$, is

$$A = P(1 + r)^n$$

Let’s say you invested R1500 at an interest rate of 5% over 6 years. What would the investment increase to?

<table>
<thead>
<tr>
<th>Information</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A = ?$</td>
<td>$A = P(1+r)^n$</td>
</tr>
<tr>
<td>$P = 1500$</td>
<td>$= 1500 (1 + 0.05)^6$</td>
</tr>
<tr>
<td>$r = 5% = 5/100 = 0.05$</td>
<td>$= 1500(1.05)^6$</td>
</tr>
<tr>
<td>$n = 6 \text{ years}$</td>
<td>$= 2010.14$</td>
</tr>
</tbody>
</table>

Calculate the accrued amount if you invest R1500 at an interest rate of 5% over 6 years if the interest is calculated twice a year.

<table>
<thead>
<tr>
<th>Information</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A = ?$</td>
<td>$A = P(1+r)^n$</td>
</tr>
<tr>
<td>$P = 1500$</td>
<td>$= 1500 (1 + 0.025)^{12}$</td>
</tr>
<tr>
<td>$r = 5% = 5/100 = 0.05 \text{ per year} = 0.05/2 \text{ every 6 months}$</td>
<td>$= 1500(1.025)^{12}$</td>
</tr>
<tr>
<td>$n = 6 \text{ years} = 12 \times 6 \text{ months}$</td>
<td>$= 2017.33$</td>
</tr>
</tbody>
</table>
2.4 Types of interest rate

Two general types of interest rate exist for debt instruments:

- The most common type of interest rate is **fixed-rate**. Fixed-rate instruments contain a fixed denomination throughout the life of the instrument. Most bonds exhibit this type of interest rate.

- Another type of interest rate is **variable-rate**. Variable rate instruments are usually attached to an index that floats based on the economics condition such as Prime rate or CPI. The inflation-indexed instrument is a type of variable-rate instrument that is created to combat inflation.

It is very common for firms to create contract that swap between the two types of interest rate. These kind of contractual agreements are called interest rate swaps.

Please complete Activity 2.

Calculate the (i) interest and (ii) the final amount for each of the principals for the stated simple interest rate and time period:

a. R500; 7%; 1 year

<table>
<thead>
<tr>
<th>Information</th>
<th>Calculation</th>
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</thead>
<tbody>
<tr>
<td>I = ____________</td>
<td>$I = Prn$</td>
</tr>
<tr>
<td>P = ____________</td>
<td>$= ____________$</td>
</tr>
<tr>
<td>r = ____________</td>
<td>$= ____________$</td>
</tr>
<tr>
<td>n = ____________</td>
<td>$A = P + I$</td>
</tr>
<tr>
<td></td>
<td>$= ____________$</td>
</tr>
<tr>
<td></td>
<td>$= ____________$</td>
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</table>

b. R500; 24%; 3 months

<table>
<thead>
<tr>
<th>Information</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I = ____________</td>
<td>$I = $</td>
</tr>
<tr>
<td>P = ____________</td>
<td>$= ____________$</td>
</tr>
<tr>
<td>r = ____________</td>
<td>$= ____________$</td>
</tr>
<tr>
<td>n = ____________</td>
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c. **R1000; 8%; 1 year**

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d. **R200; 12%, 18 months**

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e. **How many months will it take until the interest on R900 at 12% will be R135?**

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f. **A credit card holder has owed the credit card company R200 for a month and receives an account containing an interest charge of R3. Find the interest rate.**

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<table>
<thead>
<tr>
<th>g. Find the future value at the stated nominal interest rate compounded annually (once a year).</th>
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<tbody>
<tr>
<td>i. <strong>R200; 20 years; 5%</strong></td>
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<td>A = ?</td>
<td>A = P (1+r)^n</td>
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<td>= ____________________</td>
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| ii. **R300; 10 years; 6%** |

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</table>

| iii. How many years will it take at 7% compounded annually for R5000 to amount to R20000? |

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| iv. How many years will it take for a sum of money to double at 10% compounded annually? (Hint: let P = x. Then A = ______) |

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| v. Find the rate of interest compounded annually at which a sum of money will double in 20 years. |

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2.5 Analysis of interest rate risks

Interest involves the future, which is uncertain. Some interest bearing investments are riskier than others are. The greater the risk of the security, the more interest the investors will expect to receive.

The fundamental determinants of interest rate of a debt instrument are these risks. The following is a list of risks commonly associated with interest rates:

- **Credit risk** – the risk of default on the loan due to bankruptcy
- **Maturity/Term risk** – the risk involved in a long-term investment
- **Liquidity risk** – the need of compensating the illiquidity of the debt
- **Inflation risk** – macroeconomic price changes
- **Exchange rate risk** – currency fluctuation

Interest rate has been analysed in almost every way possible. All the above listed risks have been scrutinized to test their effects on the interest rate.

- **Credit risk**
  
The credit risk is the most commonly associated risk. The more credit-worthy an individual person or a company is, the more likely they will be given a loan by a bank. This means having a good credit record which entails owing little money and paying bills on time.

- **Liquidity risk**
  
  If you borrow money, say from a bank, then the bank must be able to get the money back if they need to at short notice. If they cannot get the money back from you quickly, they are taking a risk. This is called liquidity risk. Obviously, the higher the risk, the higher the interest rate.

- **Inflation and exchange rate risks**
  
  Majority of the inflation and exchange rate risk come from loans to developing countries. Therefore, loans offered by banks in developed countries usually make sure that the loan contract is in terms of stable currencies such as the US Dollar, Pound Sterling, or Euro.

  This has led to unfavourable consequences for the borrowers of developing countries because the economies of developing countries often have high inflation and unstable exchange rate.
2.6 Effective interest rate

In contrast to a nominal interest rate, the period of time after that the interest is credited, coincides with the basic time unit (normally one year). Thus, given an interest rate of \( r \), an initial capital is increased by the factor \( (1+r) \) after each time unit.

- **Nominal interest rate**

This is one of the greatest misnomers in economics. If real interest rate is the real rate of interest, the nominal interest rate is not the real thing. In fact it is the sum of the expected real interest rate plus the expected inflation rate over the duration of the loan. It is adding apples and pears. Nominal interest rate is not an interest rate at all, but the sum of two different concepts in economics.

- **Adding more uncertainties**

When comparing interest rates, nominal interest rates and effective interest rates have to be distinguished. An interest rate is called nominal if the period of time after that the interest is credited (e.g. a month) is not identical to the basic time unit (normally a year).

Let's assume an annual interest rate of 6%, which is credited after each month. This means that an interest of \( 6\% / 12 = 0.5\% \) is credited every month. After one year, the initial capital is increased by the factor \( (1+0.005)^{12} \approx 1.0616 \). As a result, this nominal interest rate is equivalent to an effective interest rate of 6.16%.

2.7 Time value of money

The time value of money (TVM) or the present discounted value is one of the basic concepts of finance. We know that if we deposit money in a bank account we will receive interest. Because of this, we prefer to receive money today rather than in the future. Money we receive today is more valuable to us than money received in the future by the amount of interest we can earn with the money. This is referred to as the time value or cash value of money. It is the change in purchasing power of money over time.

It also takes into account default risk and inflation. 100 monetary units today is a sure thing and can be enjoyed now. In 5 years that money could be worthless or not returned to the investor.

To adjust for this time value, we use two simple formulae. The present value formula is used to discount future money streams: that is, to convert future amounts
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… to their equivalent present day amounts. The future value formula is used to convert today’s money into the equivalent amount at some time in the future.

■ **Future value**

One hundred units invested today at 5% per year interest rate will yield 105 units in 1 year. So the future value of 100 units in 1 year at 5% per year is 105 units.

\[
FutureValue = \text{present amount} \times (1 + \text{interest rate})^{\text{term}} = 100 \times (1 + 0.05)^1 = 105
\]

■ **Present value**

One hundred units 1 year from now at 5% interest rate is today worth:

\[
PresentValue = \frac{\text{present amount}}{(1 + \text{interest rate})^{\text{term}}} = \frac{100}{1.05} = 95.23.
\]

So the present value of 100 units 1 year from now at 5% is 95.23 units.

The present value of a future transaction is the nominal amount of money to change hands, adjusted to account for the time value of money. A given amount of money is almost always more valuable sooner than later, so present values are generally smaller than corresponding future values.

Present value is additive. The present value of a bundle of cash flows is the sum of each one’s present value.

Many financial arrangements (including bonds, other loans, leases, salaries, membership dues, annuities, straight-line depreciation charges) stipulate structured payment schedules, which is to say payment of the same amount at regular time intervals. The term annuity is often used in to refer to any such arrangement when discussing calculation of present value, whether or not the arrangement is a retirement plan.

This entire discussion thus far makes some enormous assumptions:

- That it is not necessary to account for price inflation.
- That it is not necessary to account for variable interest rates.
- That receipt of payments when due is certain.
- That we will live long enough to receive payments receivable by us in the future.

---

My Notes …
2.8 Annuity

An annuity is a series of periodic payments, usually made in equal amounts. Annuities can be classified by when they begin and end, by when the payments are made, and by whether or not the payment intervals coincide with the interest intervals.

We will investigate simple ordinary annuities certain, usually just called ordinary annuities.

Note: An ordinary annuity certain is called this because:

- It is simple since payments are made quarterly and interest is accrued quarterly.
- It is ordinary annuity since the payments are made at the end of each quarter.
- It is certain since it begins now and ends 5 years from now.

In our work, we shall use the following symbols:

- \( n \) = Number of periods
- \( r \) = Interest rate per period
- \( R \) = Payment per period
- \( F \) = Future value of the annuity

To calculate the Future Value of Ordinary Annuity we use the formula

\[
F = R \left( \frac{(1 + r)^n - 1}{r} \right)
\]
If R100 is deposited in an account at the end of every quarter for the next 5 years, how much will be in the account at the time of the final deposit if interest is 8% compounded quarterly?

As usual, we always write down the information we have been given:

\[ R = R100, \]
\[ r = 0.08/4 = 0.02, \]
\[ n = (5 \text{ years})(4 \text{ quarters per year}) = 20 \text{ periods}. \]

Using the annuity future value formula

\[ F = R \left( 1 + \frac{r}{n} \right)^n - 1 \]

and substituting the given values, we get

\[ F = 100 \left( 1 + 0.02 \right)^{20} - 1 \]
\[ = 100(24.29736982) \]
\[ = R2,429.74. \]

Observe that 20 payments of R100 each amount to R2,000. The R2,429.74 amount is this R2,000 plus interest for varying lengths of time on all payments except the last one.

### Sinking funds

A sinking fund is a fund into which periodic payments are made in order to accumulate a specified amount at some point in the future. For example, say a corporation needs money to expand so it sells R1 million worth of bonds payable in 10 years. The firm must pay interest to bondholders (usually semi-annually) while the bonds mature and, at maturity 10 years later, must pay R1 million to redeem the bonds. To be sure that the R1 million is available 10 years hence, the corporation may set up a sinking fund to accumulate this amount. The problem is to determine \( R \), the required periodic payment into the sinking fund. The \( n \) payments constitute an ordinary annuity of \( R \) per period, and the known future value of this annuity is

\[ F = R \left( 1 + \frac{r}{n} \right)^n - 1 \]

Solving this for the unknown periodic payment \( R \), we have

\[ R = \frac{F \cdot r}{\left( 1 + \frac{r}{n} \right)^n - 1} \]
How much should be deposited in a sinking fund at the end of each quarter for 5 years to accumulate R10,000 if the fund earns 8 percent compounded quarterly?

We have

\[ F = R10,000 \]
\[ r = \frac{0.08}{4} = 0.02, \text{ and} \]
\[ n = (5 \text{ years})(4 \text{ quarters per year}) = 20 \text{ periods}. \]

Hence

\[ R = \frac{10000}{0.02} \left(1 + 0.02\right)^{20} - 1 \]
\[ = 10,000(0.041156718) \]
\[ = R411.57. \]

Over the life of the sinking fund, the sum of the deposits will be

\[ 20(411.57) = R8,231.40. \]

This sum, plus interest earned, will provide the desired R10,000.

Please complete Activity 3.
Find the present value of the following ordinary annuities:

a) R400 every 3 months for 5 years at 8% compounded quarterly

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<td>( F = )</td>
<td>( F = R \left(1 + \frac{n}{r}\right)^{-1} )</td>
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<td>( R = )</td>
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b) R1000 per month for 3 years at 12% compounded monthly.

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<td>( F = )</td>
<td>( F = R \left(1 + \frac{n}{r}\right)^{-1} )</td>
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<td>( R = )</td>
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### Information

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<td>F</td>
<td>( F = R \left( \frac{1 - (1 + r)^n}{r} \right) )</td>
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<tr>
<td>r</td>
<td>( r = \frac{0.12}{12} = 0.01 ) per month, and</td>
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<tr>
<td>n</td>
<td>( n = (3 \text{ years})(12 \text{ months per year}) = 36 \text{ periods}. )</td>
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<tr>
<td>R</td>
<td>( R = \frac{r}{1 - (1 + r)^n} )</td>
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### Amortization

In many financial transactions, a current obligation is discharged by making a series of payments in the future. After the last payment, the obligation ceases to exist – it is dead – and it is said to have been amortized by the payments. Examples of amortization are loans taken to buy a home or a car and amortized over a period of 20 to 30 years in the case of a home mortgage and over 2, 3, or 4 years in the case of a car purchase loan. Given the amount of the loan (the current principal, \( P \)), the number of periods \( (n) \), and the interest rate \( (r) \), the quantity to be calculated is \( R \), the amount of the periodic payment. The \( n \) payments of \( R \) Rands each constitute an ordinary annuity whose present value is \( P \), and we have learnt that

\[
P = R \left( \frac{1 - (1 + r)^n}{r} \right)
\]

Solving this for the unknown \( R \), we have

\[
R = \frac{r}{1 - (1 + r)^n}\
\]

---

**Example**

Sam borrowed R5,000 to buy a motorbike. He will amortize the loan by monthly payments of R\( R \) each over a period of 3 years.

a) Find the monthly payment if interest is 12 percent compounded monthly.

b) Find the total amount Sam will pay.

For part (a) we have

\[
P = R5,000, \quad r = 0.12/12 = 0.01 \text{ per month, and} \quad n = (3 \text{ years})(12 \text{ months per year}) = 36 \text{ periods}.
\]

Hence,

\[
R = 5,000 \cdot \frac{0.01}{1 - (1 + 0.01)^{36}} = 5,000(0.03321431) = R166.07
\]

b) Sam pays R166.07 a month for 36 months. The total paid will be

\[
36(166.07) = R5.978.52, \text{ of which R978.52 is interest.}
\]
Mortgage payments

Normally when you buy a home, you pay a cash deposit and borrow the rest of the money, usually from a bank. As security for the loan, the bank usually obtains a mortgage (conditional title to the property). The buyer amortizes the indebtedness by payments over a period of time. Typically payments are monthly and the time period is long - 20 years is not unusual.

A R70,000 bachelor's flat is to be purchased by paying R10,000 in cash and a R60,000 mortgage for 30 years at 9.75 percent compounded monthly.

a) Find the monthly payment on the mortgage.

b) What will be the total amount of interest paid?

a) For a principal amount of R60,000,

\[ P = 60,000, \quad r = \frac{0.0975}{12}, \quad n = 30(12) = 360. \]

So

\[ R = 60,000 \left(1 - (1 + \frac{0.0975}{12})^{-360}\right) = 60,000(0.008591544) = R515.49. \]

b) The total amount paid in 360 months will be

\[ 360(515.49) = R185,576.40. \]

Interest paid will be

\[ R185,576.40 - R60,000.00 = R125,576.40. \]

The amount of interest just calculated is very large, but it must be remembered that the buyer has a home to live in for 30 years and, moreover, real estate values have risen, and are predicted to continue to rise. If the experience of the past 30 years is repeated, the value of the home when the mortgage has been paid off could easily be three times its purchase cost.

Please complete Activity 4.

a. Lerato successfully completed her studies and found a job as a IT technician. She wanted to buy new Chevrolet Aveo. She needed to obtain financing from the bank to the value of R90 000 to buy the vehicle. The monthly compounded interest rate is 12%. She will amortize the loan by monthly payments over a period of 4 years.

i. Find the amount of each payment.

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<td>( F )</td>
<td>( R = P \left( \frac{r}{1 - (1 + r)^{-n}} \right) )</td>
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<tr>
<td>( r )</td>
<td>( \frac{12}{12} )</td>
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<tr>
<td>( n )</td>
<td>( 4 \times 12 )</td>
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<tr>
<td>( R )</td>
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</table>

ii. Find the total amount that Lerato will pay.
A R370,000 townhouse is to be purchased by paying R100,000 in cash and a R270,000 mortgage for 20 years at 12 percent compounded monthly.

i) Find the monthly payment on the mortgage.

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\[
R = \frac{P \cdot r}{1 - (1 + r)^{-n}}
\]

ii) What will be the total amount of interest paid?

A R40,000 should be deposited in a sinking fund at the end of each quarter for 4 years to accumulate R40,000 if the fund earns 6% compounded quarterly.

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\[
R = \frac{F \cdot r}{(1 + r)^n - 1}
\]

2.9 Futures

Among the primary functions of futures and options markets is the discovery of prices, and thus these markets serve a vital economic role. Prices ration available supplies. Futures markets establish prices of products for deferred delivery in the future. Options are traded on underlying futures contracts. Prices determined by futures markets affect production and consumption decisions of individuals and firms not only in South Africa but also internationally. Futures and options markets permit supply and demand to operate in relative freedom to discover prices for both nearby and future time periods.

Prices of products ranging from soybeans to gasoline to foreign currency are determined in futures and options markets. These markets trade futures and options contracts for four basic categories of products: agricultural commodities (e.g. corn), metals (e.g. silver), natural resources (e.g. crude oil), and financial instruments.
The price of a future is determined via arbitrage (speculator) arguments. The forward price represents the expected future value of the underlying discounted at the risk free rate – as any deviation from the theoretical price will afford investors a risk less profit opportunity and should be arbitraged away.

### Pricing of a futures contract

The price of a futures contract can be divided into three main elements:

- The spot price of the underlying asset;
- The financing cost, such as interest, storage or insurance costs for the underlying cash-market asset; and
- The cash flow, if any, generated by the underlying asset.

These three elements are incorporated in the following formula:

\[ \text{Futures price} = \text{cash price} + (\text{fc} - \text{cf}) \]

Where

- \( \text{fc} = \text{financing cost (or gross carry cost)} \)
- \( \text{cf} = \text{cash flow of underlying asset (if applicable)} \)

The above formula is at times also written as:

\[ \text{Futures price} = \text{cash price} + \text{net carry cost} \]

where net carry cost \( = \text{fc} - \text{cf} \)

The net carry cost can be positive or negative, depending on the relative size of the financing cost and the cash flow of the underlying asset.

**Example**

Gold pays no dividends or interest – so to price a gold futures contract only the cash price and financing cost need to be considered. Suppose the spot price of gold is $500/oz., the one-year borrowing rate is 9% p.a., and storage and insurance cost $5/oz. p.a. In such a case the futures price of a gold contract one year hence will be:

\[ $500 + ($500 \times 0,09) + $5 = $550/oz. \]

The discount factor used to discount the futures price payable on the expiry date to a cash price is the so-called carry date (i.e. net carry cost/ spot price). In this example the net carry cost amounts to:

- interest cost (9% x $500) = $45
- storage and insurance = $5
- less cash flow = 0
- Total net carry cost = $50

The carry rate is thus equal to 10% p.a. (50/500). By discounting the forward price of $550 by this carry rate, the cash-market price should again be obtained (550/1.10). If this is not the case, mispricing is evident, and hence there would be risk-free arbitrage opportunities.

The above simplified exposition needs refinement in practice. As noted, storable futures are calculated using the carry-cost pricing model, while perishable futures are priced by means of the implied-forward-rate pricing model.
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**The carry-cost futures pricing model**

Futures contracts on non-income-generating storable assets

Most commodities fall into this category and the fair value (or theoretical value) of the futures contract is determined by the following equation:

\[ FVF = P(1 + R)^{t/365} \] (using compound interest)

Or \[ FVF = P + (P \times r \times t/365) \] (using simple interest)

Where

- \( FVF \) = fair value of a futures contract expiring in \( t \) days
- \( P \) = current spot price of underlying assets
- \( r \) = carry cost (largely interest charges)
- \( t \) = days to settlement

Suppose a South African wanted to speculate in white maize and on 9 June 2003 bought one white maize futures contract. On that date the following information was applicable:

- White maize price (per ton) = R540
- Futures trading date = 9 June 2003
- Futures trading date = 1 September 2003
- Short-term rate (cost of borrowing) = 16% p.a.
- Contract size = 1 ton of white maize

The fair value (theoretical price) of the white maize futures contract \((FVF)\), which is the applicable price on the futures expiry date, consequently is:

\[ FVF = R540 \times (1 + 0,16)^{84/365} = R559,88 \] (using compounded interest although some markets use simple interest instead)

**Please complete Activity 5.**

You decided to speculate in white maize and on 1 June 2004 and bought one white maize futures contract. On that date the following information was applicable:

- White maize price (per ton) = R890
- Futures trading date = 1 June 2004
- Futures trading date = 1 November 2004
- Short-term rate (cost of borrowing) = 14% p.a.
- Contract size = 1 ton of white maize

Calculate the fair value (theoretical price) of the white maize futures contract.

\[ FVF = R540 \times (1 + 0,16)^{84/365} = R559,88 \] (using compounded interest although some markets use simple interest instead)
2.10 Asset classes

There are several types of asset classes and a good investment portfolio will involve investing in a variety of asset classes. The typical asset classes are:

- cash,
- shares,
- bonds and
- property.

There is another division of asset class known as hard assets, which include items such as artworks, stamps, jewellery and antique furniture. To effectively invest in hard assets requires a great deal of in-depth, specialist knowledge about value, quality and prices, and is usually best left to the experts!

So, the four asset classes we will primarily consider are cash, shares, bonds and property. (Note that “bonds” as an asset class do not refer to home loans. A bond investment involves lending money to a big institution, like the government or a public company. They in turn repay the money you lend them at a fixed rate of interest at a specified time.

Why is it important to invest across the spectrum of asset classes? Basically the time-honoured principle, "Don't put all your eggs in one basket" applies here. Wise investing involves diversifying your asset categories. To put it very generally, different asset classes behave differently at different times. If one of your investments in a certain asset class takes a turn for the worse, the possibility exists that another investment in another asset class may be moving up. If you diversify sufficiently, the overall return on your combined portfolio should remain positive, even if one asset sector underperforms.

■ Another reason to diversify

Certain investments give you income, and other investments give you capital growth. Income can be in the form of interest, for example from bank deposits. Capital growth is profit that can be made from buying something and later selling it for a higher price than your original price. Capital growth can usually be made from investments such as shares or property. (Some investments, such as bonds and property, can give you income and capital growth.)

A good mix of investments can give you both income and capital growth. However, your investment goals will dictate, very broadly, the type of investments you need. If you are heading for a long-term target, investments that give you capital growth are a good choice. If you need a regular income from your investments, you would choose the type of investments that give you an income.
Here's an example: Over the course of a lifetime, it's possible that you would invest primarily in capital growth investments during your working life, and then at retirement you could invest some of that in investments that give you income. Note that even in retirement you would still retain some capital growth investments to ensure that you have enough money until you die.

### The concept of liquidity

Liquidity can be described as having access to the money you have invested. An illiquid investment, such as bricks-and-mortar property, is difficult to sell immediately. Shares are a liquid investment as they can be sold quickly. If you have a mix of investments across the asset classes, some will be more liquid than others. This is important if you have an emergency and have to cash in one or more of your investments. But of course, any emergency 'cashing-in' is best avoided, as it could result in severe losses and derail you from your long-term investment goals.

#### 2.11 Investing in bonds

Don't confuse bond investments with your mortgage bond! A bond is a long-term loan made to an institution for a stipulated period of time. The institution agrees to repay the full sum of the loan at the end of that period (the date of maturity), plus a fixed rate of interest on the borrowed amount at established intervals during the loan period.

The actual bond is a certificate (also known as a coupon) that is issued when a big institution needs to borrow money. Various kinds of bonds are offered by the government, by parastatals or former parastatals (e.g. Eskom, Telkom) and by private corporations. Government bonds are commonly referred to as "gilt-edged" bonds or "gilts" and are considered virtually risk-free as the government itself guarantees payment of the face value (as shown on the coupon) at the stated maturity date of the bond, as well as payment of the interest, which is paid half-yearly.

"Semi-gilts" offered by parastatals carry a slightly higher risk rating than gilts, and the corporate bonds are considered to be the most risky. The higher the risk rating, the higher the interest rate offered.

Bonds generally pay interest at a fixed rate ("coupon rate") shown on the certificate, based on the "face value" of the bond. For example, if the coupon rate is 10% and the face value is R1 million, it means that the bond would yield a fixed income of R50 000 (i.e. 5% of R1 million) every six months until the maturity of the bond.

Bonds may be on-traded (bought and sold) in the secondary bond market. Any movement of interest rates in the capital market therefore has a direct influence on the market value (as distinct from the face value) of the bond. Using the example above, if the market interest rate (i.e. the current rate available in the capital market) should drop to say 5% p.a., then the issued bond which guarantees a yield of R50 000 every six months would naturally have a market value well in excess of
Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues.

Primary Agriculture

NQF Level 4

Unit Standard No: 7468

Version: 01                 Version Date: July 2006

its face value of R1 million. The holder of such a bond may decide to sell the bond for its market value and realise a capital profit. The opposite is unfortunately also true if interest rates should rise.

There are two other types of bonds: "zero-coupon" bonds which pay no interest, but which guarantee a larger maturity value, and "inflation-linked" bonds, where the yield offered by the bond is directly dependent upon the inflation rate – the higher the inflation rate, the higher the yield.

Bond trading is a highly specialised job for experts only. One bond usually costs in the region of R1 million. This brings us to the question: where do bonds fit in to the average investor's portfolio?

Bonds and the average investor

Because bonds typically have a predictable stream of payments and repayment of capital, they are considered relatively low risk. This makes them attractive as part of a balanced investment portfolio. But the cost of buying one bond is prohibitively high for most of the investing population. However, for a monthly instalment of a few hundred rands you can access a diversified portfolio of bonds through a unit trust fund, one that invests primarily in bonds. The money that you invest in such a unit trust fund is managed by the fund's investment manager to buy and sell bonds.

Bear in mind that unit trusts are not short-term investment vehicles. It takes years for a unit trust account to really come into its own and show overall growth.

Bonds as part of your portfolio

The returns on bond investments will be stable but probably not spectacular (although occasionally there are periods where circumstances in the country's economy create a particularly favourable environment for bonds, resulting in excellent returns). Investing in a unit trust fund involves charges – you will pay an initial charge and an annual charge. Consider these points when deciding how much of your portfolio to allocate to bonds. As with all the other asset classes, it depends on your attitude towards risk and what sort of returns you are after.

2.12 Investing in shares

Shares are also known as stocks or equities. A share is a portion of a company available for purchase by a private individual. If you buy shares in a company, you become a shareholder in the company.

Shares are bought and sold through stockbrokers. If you'd like to invest in shares, contact the JSE Securities Exchange via their website www.jse.co.za for a list of credited brokers to choose from.

Buying is quite straightforward. You contact your broker and ask for the price of the shares you want to buy. Then you tell him or her how many shares you would like to
purchase. Via an electronic process the stockbroker executes the deal, and secures the shares under your name.

These days it is also possible to buy shares online via the Internet yourself without going through a stockbroker, but you will need to know what you are doing, and for a first-time investor it is probably best to use the services of a stockbroker.

You can start investing in the stock market with as little as R1 000, but generally a stockbroker would prefer to open a portfolio for you with between R5 000 and R10 000. If that sounds like a tall order, consider forming a syndicate or ‘investment club’ with a few other people. Your syndicate pools money, agrees on shares to purchase, and makes all the buying and selling decisions together. Strict rules need to govern investment syndicates.

As with bonds (see October article) you can also invest in shares via unit trusts. But the rewards of investing in shares directly will be far greater – but probably more risky.

### Factors to consider when choosing shares

If you’re going to make money by investing in shares, you need to become very knowledgeable. There are plenty of opportunities to gain knowledge. For starters, take some time to visit the JSE Securities Exchange if you live in or visit Johannesburg. They do regular guided tours for the public, designed to give you an excellent idea of how the stock markets work.

Several companies run courses for novice investors that teach the basics of investing in the stock market and help you to practise your new skills with a 'mock' portfolio of shares. Many stock broking houses issue free monthly newsletters to their clients with information on good shares to buy. You can also get useful advice from the website of a stock broking house.

Shopping around for good shares to buy is much the same as buying a new home – you need to make your decision carefully and do your homework. The rewards are there for those who are teachable and want to constantly increase their knowledge of the share market.

Investigate and analyse a company’s financial prospects. All companies quoted on the JSE Securities Exchange must make their financial statements available to the public. By looking at the income statement and the balance sheet of a company you will get a fair idea of a company’s performance.

The world of share investing is populated with several terms. Here are just three terms that you will find useful when analysing shares:

- **Dividends and dividend yields:**

  A dividend is a proportion of company profits paid to shareholders at regular intervals. A dividend yield is the annual dividend expressed as a percentage of the market price of the share.
The price/earnings (P/E) ratio:

This is the market price of a share divided by the company's earnings (profits) per share in its latest 12-month trading period. Broadly speaking, a high P/E ratio means that the market considers a company likely to produce above-average growth, while a low P/E ratio means the opposite.

Net asset value (NAV):

This is an important feature for certain types of companies, particularly property and investment companies. The NAV is used to determine the value of a company's shares. The NAV indicates the kind of market rating a share has. If the share is offered at a price higher than its NAV, it has a high market rating. But if it is offered at a price lower than its NAV, it is not highly rated and this could be an indication of an expected reverse in profitability or that a takeover is on the cards.

Capital growth

Capital growth is profit that can be made from buying something and later selling it for a higher price than your original price.

Share prices go up and down. The price of a share is based on the expectations investors have of the future profits of a company. If the company's prospects are good, more investors will want to buy shares in that company, therefore pushing up the share price. So, if you bought shares in that company when the price was low, you can sell your shares later when the price has gone up and thus make a capital gain in the process. Of course, the opposite is also true – if you buy high and sell low, you can make a capital loss.

To minimise your chances of making a capital loss, it's worth following a stop-loss strategy. A stop-loss is the greatest loss that you are prepared to take on a share. Decide your stop-loss level at the time of your share purchase, and stick to it.

For example, if you set your stop-loss level at 10% and you buy a share for R10, you will sell if the share falls to R9 – a loss of 10%. If the share price increases, say from R10 to R20, and then drops again, your stop-loss level remains 10%, so you would sell when the price drops to R18. By setting a stop-loss level and being true to it, you won't hang on to a share that keeps on dropping in price, hoping it will go up again. You'll be able to sell and get out of that shareholding before you've lost too much money.

Several factors contribute towards the best time to sell a share, but one factor is key: discipline. Losses are made by investors hanging on to shares for longer than they should as the price falls, in the hope that the price will turn around and go up. That's why your stop-loss strategy is so important.

Income from shares comes in the form of dividend payouts. As a shareholder in a company, you are a part owner, which means you are entitled to a share of the company's profits. Profits paid out to shareholders are known as dividends.
Dividend payouts from shareholdings can provide an investor with a steady income stream. Of course, not every share is ideal for this purpose, and generally it is the more solid, blue-chip companies that yield good dividends over time.

A balanced share portfolio could contain some shares that provide opportunity to be sold for capital gain after a period of time, and some shares that you hold on to for an extended period for their dividend payouts. The mix depends on your investment goals, and whether you are more interested in an income stream from your shares, or in capital gain that you can reinvest or use for a specific financial goal.

† Shares and risk

Is it risky to invest in the stock market? Yes, if you invest ignorantly without first growing your knowledge and understanding of the stock market. No, if you equip yourself with the right tools and information. Only take advice you trust when it comes to choosing a share. 'Hot' share tips from the office gossip are not sure bets – get professional advice and do your own research. And don't get too attached to any shares. Emotions should not come into play when investing in the stock market. You should be detached enough to know when to sell.

If you're not scared to try stock market investing, you could be on the way to wealth - but only if you're prepared to learn over time and be disciplined in your investments.

2.13 Pooled investments

Thousands of investors don't have the kind of money and knowledge to create a massive investment portfolio, but by pooling their money they can have access to a wide range of investments. This is the essence of collective investments – money is pooled into a portfolio or fund which is managed by an asset manager, who then has the same buying power as a billionaire investor.

The main attraction of collective investments for the average investor is that they are affordable. The minimum monthly amount payable can be as little as R100. Another attraction is that you don't need time and expertise to select good investments – the asset manager does that for you.

There are four main types of collective investments:

- Endowment policies;
- Unit trusts;
- Multi-manager investments; and
- Exchange Traded Funds (ETFs).
The popularity of unit trusts is growing both internationally and locally at a rapid rate, and for good reason. The list of advantages is long, but first, a brief explanation of unit trusts.

### What is a unit trust?

A unit trust is a collective investment offered by a financial institution. The money that you invest in a unit trust product is used by the unit trust's investment manager to buy and sell a selection of shares, fixed interest investments, cash deposits and other investment instruments. This selection is called a portfolio.

### What are the advantages of unit trusts?

Unit trusts are recommended for several reasons:

- They tend to outperform inflation over the long term. This is especially true of general equity unit trusts – ones that offer a diversified portfolio of shares.

- They are affordable. Most unit trusts are designed for the average investor who may have a tight budget but would like to invest nonetheless.

- They offer freedom in terms of investment time periods and selling out. You can invest in a unit trust fund for as long as you like, because you are not tied down to time period clauses. And you can sell whenever you wish because there will always be a guaranteed buyer – the management company has to buy your units back from you at the price prevailing on the day.

- They offer quick turnaround times when you do decide to sell. Most management companies will have the selling amount available to you within two to four days of your sell instruction.

### How to manage your unit trust account

If you are going to make the most of unit trusts, you have to follow two golden rules:

- **Be patient**

  Unit trusts are not short-term investment vehicles. If you expect to buy unit trusts and sell them after six months, you are wasting your time. Because market prices fluctuate daily, your units could be worth less today than they were yesterday. It takes years for a unit trust account to really come into its own and show overall growth. Operate your unit trust account with a medium- to long-term view (at least five to 10 years for good returns).

- **Don't sell your unit trusts if there is a market crash**

  A downturn in the markets is the best time to be a unit trust investor, because your money will buy more units (because shares etc. will be cheaper). Sit tight and wait – you'll reap the rewards later.
How do you choose between 450 unit trust funds?

The first South African unit trust fund was launched in 1965. Eleven more funds were launched by 1979, and by the end of the 80’s, the industry boasted a grand total of 31 funds. But this growth was slow compared to the explosion of the 90’s, when nearly 300 unit trust funds entered the market.

Until this time the majority of unit trust funds had been equity funds, meaning they invested in shares. But the new entrants to the unit trust market included several new types, such as money market funds, bond and gilt funds, specialist equity funds (which focused on certain sectors of the stock market), and international funds.

With a mind-boggling array of unit trust funds to choose from these days, it’s useful to know the broad categories of funds and their basic characteristics. This will help you decide which unit trusts to buy, in keeping with your overall investment objectives.

Main categories

All funds fall under one of four main classes:

- **Domestic funds**
  
  A minimum of 85% of their assets is invested in the South African market.

- **Worldwide funds**
  
  These funds invest in local and foreign funds. A minimum of 15% of assets must be held in South Africa and a minimum of 30% must be held offshore.

- **Foreign funds**
  
  Unit trust funds that invest at least 85% of their assets offshore.

- **Regional funds**
  
  These unit trusts invest at least 85% of their assets in a single country or region outside South Africa.

Already, these broad classifications will give you some idea of what unit trusts to choose. For example, if you would like primary exposure to foreign markets, a foreign fund is ideal.

Sub categories

Within each class there are further types of funds:

- **Equity unit trusts**
  
  These funds invest primarily in shares. There are several types of equity unit trusts, and here are just some of them:

  - **General funds**, which invest in shares across all industry sectors;
• Growth funds, which invest in companies whose earnings are likely to grow strongly;
• Value funds, which invest in 'undervalued' companies, i.e. companies trading at market prices below their intrinsic value;
• Funds that invest only in large companies and funds that invest only in small companies;
• Financial funds;
• Industrial funds, and
• Resources funds.

♦ Asset allocation unit trusts

These funds invest in equity, capital, money and property markets. They include prudential funds, flexible funds and targeted absolute return funds.

♦ Fixed interest unit trusts

These funds invest in bonds and money market instruments. They include bond funds, income funds, money market funds, and funds investing in the entire range of fixed interest instruments.

Making a choice

In choosing a unit trust, find out what its primary investment aim is, and see how this aligns to your overall investment strategy. For example, fixed interest unit trusts are best suited to investors requiring an income or with a low risk tolerance; a prudential fund aims for a balance between income and capital appreciation; specialist funds, e.g. financial sector funds, tend to be more volatile than diversified funds but aim for maximum capital appreciation; and for a steady but unexceptional choice there's targeted absolute return funds, which have the simple aim of achieving a specific rate of return, e.g. 4% above inflation.

However, because the current unit trust market has about 450 funds on offer, it's worth your while consulting with a professional financial adviser. Explaining your investment objectives and your tolerance for risk will enable an adviser to help you narrow down the selection to funds that will meet your needs.

2.14 RAs versus Endowments

♦ How do they compare?

Should you be self-employed or want to supplement your company retirement fund, you can purchase a retirement annuity (RA), which is a private retirement plan. As a member you have two options on reaching retirement age:
• Taking up to one third of the retirement annuity as a cash lump sum and having the rest paid out monthly for life; or
• not taking the cash lump sum payout but getting a bigger monthly income.

Endowment policies are regular-premium savings plans in which you make monthly payments for a minimum period of five years. The money is invested in the share, property and fixed interest markets, and at the end of the agreed period you receive a lump sum.

There are some basic differences between the two products, which are important in deciding which product is best for your financial goals. The minimum investment term for RAs is up to age 55 and the maximum term is up to age 69. The minimum investment term for endowments is five years. You may usually make Ad hoc investments in both products. The amount you invest each month may be adjusted in both products, but in an endowment an increase of more than 20% results in an additional limited period of five years.

An important factor to consider with both products is accessibility. An RA forces you to save for retirement and therefore you may not access the investment before the age of 55 (unless you retire early due to disability). An endowment policy is more liquid, but access is still limited within the first five years to the investment you have made, plus 5% interest per annum, and a cash withdrawal fee and a loan fee are usually charged. It is not advantageous to make withdrawals before the maturity date of an endowment policy. Rather have cash on hand in a savings account should you need emergency money.

Then there's the question of income tax. Proceeds of an endowment policy are tax free in your hands – a big advantage of this product. In an RA, some of the one-third maximum allowed in cash at retirement is taxable at your average tax rate. The annuity you purchase with the remaining two-thirds (which pays you monthly) is taxed as income.

In weighing up which product best suits you, bear in mind too that an RA cannot be ceded to someone else (i.e. you cannot use it as security e.g. for a loan, but your heirs will receive the full benefit if you die before retirement), while an endowment policy may be ceded. And you'll also want to consider the costs – management and service fees, and financial advisor commission. Do your research first into the costs of each product, and ensure you don't get any nasty surprises.

2.15 How much should you be saving towards retirement?

If you are employed you probably contribute to your company's retirement fund. If you are self-employed, you should be contributing towards a retirement annuity (RA). Whatever vehicle you use, how do you know if you are setting aside enough money?
Here is a handy method to work out what percentage of your income you must save to provide a pension for 20 years equal to 80% of your final salary (assuming that the pension also has to increase every year to match inflation). The calculation factors in how much you have already saved. It assumes two things:

- Your income will increase at the inflation rate, and
- The rate of return your retirement money will earn will be three percentage points higher than the inflation rate.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
<th>Column C</th>
</tr>
</thead>
<tbody>
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<td>Term until retirement in years</td>
<td>Required saving as a % of gross income</td>
<td>% adjustment for existing provision equal to one year's gross income</td>
</tr>
<tr>
<td>30</td>
<td>26%</td>
<td>-4.5%</td>
</tr>
<tr>
<td>25</td>
<td>34%</td>
<td>-5.5%</td>
</tr>
<tr>
<td>20</td>
<td>46%</td>
<td>-6.5%</td>
</tr>
<tr>
<td>15</td>
<td>66%</td>
<td>-8.0%</td>
</tr>
<tr>
<td>10</td>
<td>106%</td>
<td>-11.0%</td>
</tr>
</tbody>
</table>

Let's look at three examples:

**Jennifer** is 30 years from retirement. Her current annual salary is R100,000 and her existing retirement provision is the amount already amassed in her pension fund. This amounts to R50,000, thus half (0.50) her current salary. For her calculation, she chooses 26% (from Column B) and then subtracts half of 4.5% (Column C) from that. Therefore, the percentage of her salary she will have to save for the next 30 years to meet her retirement goal is: 26% - (4.5% x 0.5) = 23.75%.

Let's say the contribution currently made to her pension fund is 17.50%, which consists of an employer's contribution of 10.0% and her own contribution of 7.5% of her salary. It follows then that the additional contribution she needs to make is as follows: 23.75% - 17.50% = 6.25% of salary.

**Kevin** is 15 years from retirement and his existing retirement provision is equal to five times his current salary. His calculation looks like this: 66% - (8.0% x 5) = 26%. His existing contribution (expressed as a percentage of his salary) should now be subtracted from 26% to determine what his additional savings should be.

**John** is 10 years from retirement and his existing retirement provision equals seven and a half times his current gross income: 106% - (11.0% x 7.5) = 23.5%. John thus has to save 23.5% of his gross income from now on to reach his retirement savings goal.

**Bridging the gap**

You might get a shock when you work out how much you should be setting aside.

It's a dangerous mistake to assume that simply because you are contributing regularly to a retirement fund, that fund will provide enough funds to live on. Some people don't even know what their monthly contributions are, let alone know how much they will accumulate by retirement! Remember, it is not your employer's responsibility to ensure that you retire financially independent – it is yours.
Not everyone wants to work until they are 65 before retiring. Before reaching that age, it is possible to create the kind of financial independence where your monthly income is generated not from your salary, but from investments.

<table>
<thead>
<tr>
<th>Concept (SO 2)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
</tr>
</thead>
<tbody>
<tr>
<td>The differences between simple and compound interest are described in terms of their common applications and effects.</td>
<td></td>
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<tr>
<td>Methods of calculation are appropriate to the problem types.</td>
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<tr>
<td>Computational tools are used efficiently and correctly and solutions obtained are verified in terms of the context or problem.</td>
<td></td>
<td></td>
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<tr>
<td>Solutions to calculations are used effectively to define the changes over a period of time.</td>
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</table>

My Notes ...

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In this session we explore the following concepts:

- Profit maximization
- Marginal revenue
- Marginal cost

### 3.1 Profit maximization

In economics, profit maximization is the process by which a firm determines the price and output level that returns the greatest profit. There are several approaches to this problem. The total revenue – total cost method relies on the fact that profit equals revenue minus cost, and the marginal revenue – marginal cost method is based on the fact that total profit in a perfect market reaches its maximum point where marginal revenue equals marginal cost.

#### Basic definitions

Any costs incurred by a firm may be classed into two groups: **fixed cost and variable cost**.

- Fixed costs are incurred by the business at any level of output, including none. These may include equipment maintenance, rent, wages, and general upkeep.
- Variable costs change with the level of output, increasing as more product is generated. Materials consumed during production often have the largest impact on this category.
- Fixed cost and variable cost, combined, equal total cost.

**Revenue** is the total amount of money that flows into the firm. This can be from any source, including product sales, government subsidies, venture capital and personal funds.

**Average cost** and revenue are defined as the total cost or revenue divided by the amount of units output. For instance, if a firm produced 400 units at a cost of R20 000, the average cost would be R50.00.
3.2 Marginal revenue

The revenue associated with one additional unit of production. Whether this is higher, lower or the same as the revenue from the previous unit of production depends on the demand for the producer’s product. In the case of a producer who supplies a very small percentage of the market, an extra unit of production is unlikely to have an effect on market prices. In this case, increased production will not affect marginal revenue. On the other hand, if the producers supplies most or all of the market (such as in a monopoly or near-monopoly), then increased production is likely to reduce marginal revenue.

For instance, taking the first definition, if it costs a firm R400 to produce 5 units and R480 to produce 6, the marginal cost of the sixth unit is approximately R80.

The demand curve is a tremendously useful illustration for those who can read it. We have seen that the downward slope tells us that there is an indirect relationship between price and quantity. One can also view the demand curve as separating a region in which sellers can operate from a region forbidden to them. But there is more, especially when one considers what an area on the graph represents.

If people will buy 100 units of a product when its price is R10.00, as the picture below illustrates, total revenue for sellers will be R1000. Simple geometry tells us that the area of the rectangle formed under the demand curve in the picture is found by multiplying the height of the rectangle by its width. Because the height is price and the width is quantity, and since price multiplied by quantity is total revenue, the area is total revenue. The fact that area on supply and demand graphs measures total revenue (or total expenditure by buyers, which is the same thing from another viewpoint) is a key idea used repeatedly in microeconomics.

From the demand curve, we can obtain total revenue. From total revenue, we can obtain another key concept: marginal revenue. Marginal revenue is the additional revenue added by an additional unit of output, or in terms of a formula:

Marginal Revenue = (Change in total revenue) divided by (Change in sales)

According to the picture, people will not buy more than 100 units at a price of R10.00. To sell more, price must drop. Suppose that to sell the 101st unit, the price
must drop to R9.95. What will the marginal revenue of the 101st unit be? Or, in other words, by how much will total revenue increase when the 101st unit is sold?

There is a temptation to answer this question by replying, "R9.95." A little arithmetic shows that this answer is incorrect. Total revenue when 100 are sold is R1000. When 101 are sold, total revenue is (101) x (R9.95) = R1004.95. The marginal revenue of the 101st unit is only R4.95.

To see why the marginal revenue is less than price, one must understand the importance of the downward-sloping demand curve. To sell another unit, sellers must lower price on all units. They received an extra R9.95 for the 101st unit, but they lost R.05 on the 100 that they were previously selling. So the net increase in revenue was the R9.95 minus the R5.00, or R4.95.

There is another way to see why marginal revenue will be less than price when a demand curve slopes downward. Price is average revenue. If the firm sells 100 for R10.00, the average revenue for each unit is R10.00. But as sellers sell more, the average revenue (or price) drops, and this can only happen if the marginal revenue is below price, pulling the average down.

The reasoning of why marginal will be below average if average is dropping can perhaps be better seen in another example. Suppose that the average age of 20 people in a room is 25 years, and that another person enters the room. If the average age of the people rises as a result, the extra person must be older than 25. If the average age drops, the extra person must be younger than 25. If the added person is exactly 25, then the average age will not change. Whenever an average is rising, its marginal must be above the average, and whenever an average is falling, its marginal must be below the average.

If one knows marginal revenue, one can tell what happens to total revenue if sales change. If selling another unit increases total revenue, the marginal revenue must be greater than zero. If marginal revenue is less than zero, then selling another unit takes away from total revenue. If marginal revenue is zero, than selling another does not change total revenue. This relationship exists because marginal revenue measures the slope of the total revenue curve.
Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues.

Primary Agriculture

NQF Level 4  Unit Standard No: 7468

The picture above illustrates the relationship between total revenue and marginal revenue. The total revenue curve will be zero when nothing is sold and zero again when a great deal is sold at a zero price. Thus, it has the shape of an inverted U. The slope of any curve is defined as the rise over the run. The rise for the total revenue curve is the change in total revenue, and the run is the change in output. Therefore,

\[ \text{Slope of Total Revenue Curve} = \frac{\text{Change in total revenue}}{\text{Change in amount sold}} \]

But this definition of slope is identical to the definition of marginal revenue, which demonstrates that marginal revenue is the slope of the total revenue curve.

Marginal revenue is the extra revenue from adding another unit of output. If a firm finds that when it sells six units, its revenue is 24, and when it sells eight, its revenue is 28, its extra revenue for adding two more units is four. Its marginal revenue, or the extra revenue for adding one more unit of production, will be two.

The graph above illustrates an alternative way to compute this extra revenue. When the firm sells six, it can charge a price of R4, but when it sells eight, it can charge only R3.50. (Thus, six units at R4 each gives a total revenue of R24 and eight units at R3.50 each gives a total revenue of R28.) When the firm sells the extra two units, it adds two units at R3.50 each, or R7 to its revenue. However, it also loses something because it had to lower the price on the six units it was previously selling. The loss is these six units times R0.50 each, or R3. The net change in revenue is R7 less R3, or R4. The equation says that to get marginal revenue, the change in total revenue (R4) must be divided by the change in output (2), which in this example gives us R2.

We can define marginal revenue by a formula that should be familiar by now, at least in its broad outlines.

\[ \text{Marginal Revenue} = \frac{\Delta R}{\Delta Q} \]
where R is revenue (that is, price times quantity sold) and Q is the quantity sold. As usual, this is an approximative formula, and the smaller the change in Q the better the approximation. We can interpret marginal revenue as (approximately) the increase in total revenue as a result of selling one more unit of output. Here’s an example of calculation of the approximation: suppose output increases from 10000 to 11000 and revenue increases from 754286 to 714286. Then we have

$$\Delta R = \frac{754286 - 714286}{11000 - 10000} = \frac{40000}{1000} = 40$$

Thus, between 10,000 and 11,000 units of output, the marginal revenue is approximately R40.

### 3.3 Marginal cost

In this section, we look at how the mathematical terminology of linear equations might be used in a real-world situation. Assume that C is the total factory (manufacturing) cost of production of a product when Q (for quantity) units of the product are made. We also assume that the relationship between C and Q is linear, as is frequently the case, and show this in Figure 3 on the next page as the line segment LM.

When making interpretations from Figure 3, keep in mind that a vertical distance represents a cost while a horizontal distance represents a quantity (number of units). Thus, the segment PT represents the total cost of producing OP units of product, and UM is the total cost of producing OU units of product.

The distance OL, the vertical intercept, corresponds to the cost of operation when zero units are produced, the reasoning here being that some costs (such as insurance on the plant) exist even when no product is being made. Borrowing an accounting term, we interpret OL as fixed cost, that is, the component of cost that does not vary with the number of units made. In the Figure, fixed cost is

$$OL = PS = UR.$$  

If we make OP units of product, the total cost is PT. PT, in turn, is the sum of PS and ST. PS is fixed cost; ST we shall call the variable cost when OP units are made. The term variable cost refers to the component of cost that changes as the number of units produced changes. Thus, ST is variable cost when OP units are made; RM is the (larger) variable cost when OU units are made. At each level of output, total cost is the sum of fixed and variable costs. Consider the ratio RM/LR. RM is the variable cost when LR (or OU) units are made.
The ratio variable cost number of units made is the variable cost per unit of product made. By definition, \( RM/LR \) is the slope of \( LM \), and the slope of a straight-line segment is constant. Consequently, variable cost per unit is constant when cost and output are linearly related.

Economic terminology leads us to another description of the slope of \( LM \) in Figure 3. Economists speak of the extra cost (the change in total cost) when one more unit is made as the marginal cost of that unit. This is the vertical change for a horizontal change of one. It is the slope of the line. We may say that when total cost is linearly related to output, marginal cost is constant. (Marginal cost, of course, will not be constant if the total cost function is not linear.)

For further practice, observe that \( UM \) is \( VM \) greater than \( PT \), which means that it costs \( VM \) more Rands to produce \( OU \) units than to produce \( OP \) units. \( TV \), on the other hand, represents how many more units can be produced for \( UM \) Rands than for \( PT \) Rands.

We have said that when total cost is linearly related to output, then variable cost per unit is constant. Average cost per unit, defined as total cost over number of units produced, is not constant. Rather than argue this statement from Figure 3, suppose that we interpret the equation:

\[
y = 3x + 2,
\]

letting \( y \) be total cost of producing \( x \) units. The fixed cost is R2 and the variable cost per unit (the slope) is R3. However, by substitution, we find that total cost rises from R17 to R32 if \( x \) changes from 5 to 10 units. The average cost per unit declines from \( 17/5 \) to \( 32/10 \), that is, from R3.40 to R3.20. This reduction sometimes is referred to as being a consequence of spreading fixed cost over a large number of units.

The cost associated with one additional unit of production – marginal cost, also called incremental cost.
**Concept (SO 3)** | **I understand this concept** | **Questions that I still would like to ask**
---|---|---
Values are calculated correctly. |  |  
Mathematical tools and systems are used effectively to determine and describe the relationships between the various aspects of cost and revenue. |  |  
Terminology is used in the correct context. |  |  
Reasonable methods are described for the control of costs and optimisation of profits in relation to given data. |  |  

**My Notes ...**

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Session 4

Aspects of National and Global economy

After completing this session, you should be able to:
SO 4: Use mathematics to debate aspects of the national and global economy.

In this session we explore the following concepts:
♦ Exchange rates in relation to imports and exports
♦ Comparative effectiveness of currency in relation to remuneration
♦ Monetary policy and the control of inflation

4.1 Exchange rates in relation to imports and exports

The exchange rate is the price of one currency in exchange for another – the amount of currency that can be bought or sold with another currency. Demand and supply for the currency in the open market determines this price. It can also be influenced by the intervention of governments through their central banks.

The value of the South African Rand in relation the US dollar has gone through some interesting phases. At the time of writing this module the Rand is trading in the order of R6.00 to the US dollar.

When you look at Fig. 4 you can see how the exchange rate of the SA currency has changed from January 1998 to July 2004 in relation to the US dollar. The graph also shows how the Inflation rate (CPIX) has changed over the same period. You can see that when our inflation rate comes down, our currency strengthens in relation to the US dollar.

My Notes …

...
Factors influencing exchange rates

CPIX compared to Rand US$ Exchange Rate

Fig. 4

The environment for foreign-exchange movements changed radically with the collapse of the system of fixed exchange rates in the early seventies. As long as there were fixed exchange rates, rates could barring a devaluation or revaluation – not go beyond the respective lower and upper intervention points. A critical issue under the fixed-rate system in the 1950’s and 1960’s, was whether a country in a bad balance-of-payments situation would have to devalue, or one in a strong payments situation would have to revalue. (With countries with weak currencies increasingly unwilling to devalue their currencies in the sixties, pressure on the surplus countries was mounting to revalue their currencies instead.)

Under a generalised system of clean floating exchange rates, rates should – according to the purchasing power parity theory – respond primarily to inflation differentials. High inflation, often the result of too generous a growth in the money supply, would lead to a weakening of the currency to the point where the rate was again in equilibrium, reflecting purchasing power parity.

- While this theory is relatively accurate in explaining at least long-term exchange rate movements (over periods of several years), it has some shortcomings. For example, it is debatable how best to measure inflation and purchasing power.
- Second, the only prices of significance are those of goods and services that are, or can be, traded internationally.
- Third, experience shows that competitiveness in international trade (of goods and services) is not only a matter of price but also of quality, prompt delivery and after-sales service.
- Finally, the purchasing power theory does not take into account capital movements as a potentially important determinant of exchange rates.
The balance-of-payments situation of a country seems to be the most direct determinant of the external value of its currency. Demand for a currency arises from exports of goods and services and from capital inflows (or imports). In turn, a currency is offered in payment for imported goods and services, and also because of capital outflows (or exports). A surplus on the overall balance of payments means net demand for a currency, creating upward pressure, while conversely an overall deficit will tend to weaken a currency. Since items on the current account of the balance-of-payments (goods, services and transfers) are irreversible, it makes sense to judge the “fundamental” position of a currency according to a country’s current account position. Capital flows, on the other hand, are reversible. For instance, borrowing abroad (capital imports) creates temporary demand for a currency when the conversion takes place, but the repayments will lead to a corresponding weakening of the currency. It works the other way round if a country lends, or exports, capital abroad.

A country’s balance-of-payments situation and prospects may therefore be the best indicator of the likely short-term movements of the exchange rate. The balance of payments, in turn, is influenced by a range of factors, including the following:

- **Faster economic growth** than other major countries tends to cause a deterioration in the trade balance (imports rising faster than exports); on the other hand, this may attract foreign capital, for example securities investments and direct investments.

- **Rising interest rates** – with other factors remaining constant - should strengthen a currency by attracting more capital. But under floating rates the market weighs the advantage of high interest rates against the downward risk of the exchange rate and, on the whole, high interest rates seem to reflect certain fundamental economic weaknesses, such as scarcity of capital and high inflation.

- **High inflation** makes a country less competitive internationally, and therefore tends to cause a deterioration in the current account. For the various reasons already mentioned, exchange rates, however, quite often either “overshoot” or "undershoot" the level indicated by inflation differentials - which does not necessarily mean, though, that prevailing rates are not "economically justified".

While economic factors are of decisive importance in determining exchange rates in the long term, non-economic factors may at times have a short-term influence:

- **Political and/or psychological factors** can have a bearing on exchange-rate behaviour, mainly by inducing capital flows. In turbulent times it is often perceptions, rather than any concrete reason, that make people move in and out of certain currencies.

- For short periods, **technical factors** can sometimes have an influence. Regulations by central banks, or internal bank regulations, about the size of open positions may, for instance, make it necessary to reduce or cover short positions at a given moment; this creates a technical, but not
genuine, demand for that currency. Or minimum reserve requirements to be met on certain reporting days can create a temporary shortage in the money market, resulting in an equally temporary strengthening of a currency.

It should be noted that market participants act not only on the basis of known facts and figures, but also on expectations. This adds to the volatility of the foreign-exchange markets under a floating exchange rate regime.

4.2 Comparative effectiveness of currency in relation to remuneration

The value of the SA currency has two sides to the story. When you work in South Africa, you will be paid in South African Rand. You will use this money to buy products and services to meet with your needs.

Some of the products that you will buy are made in South Africa, and others will be manufactured abroad. The value of the currency has a direct relationship to the price of imported products. When the Rand loses its value it means that imported goods will become more expensive. As a result you will be able to buy less goods.

If you were an exporter and the SA currency loses value against other currencies, it means you will get more Rands for each US$ that you earn.

South Africa currently (2004) imports the majority of its crude oil from abroad. As a result of the America invasion into Iraq in 2003 and the resulting chaos, the price of Brent crude oil went up from the low US$20’s up to US$50 per barrel. At the time of writing this manual the price Brent Crude Oil has come down to US$40 per barrel. This impacts directly on each individual who uses any form of transport. South Africa’s currency has strengthened against the US dollar, and as a result the price increase of petrol was not as severe as it would have been, if the currency was weak.

On the other hand, the mining companies in South Africa, have been having a tough time as they got less Rands to the US$ compared to 2002. This has resulted in retrenchments in the mining sector. These job losses has in turn lowered the disposable income of those families who no longer enjoyed the monthly income from the mine worker.

4.3 Monetary policy and the control of inflation

Monetary policy can be described as consisting of decisions that are formulated and implemented by the monetary authorities (i.e. by the Central Bank, or by the
Treasury and the Central Bank) in their various fields of operation which are aimed at achieving certain ultimate objectives with regard to the country's economy. These ultimate objectives in turn are striven for by influencing primarily the volume or composition of domestic expenditure and output in an economy mainly through the appropriate use of interest rates.

Moreover, in the contemporary world, and more particularly in the developed economies of the world, it is now widely accepted that these ultimate objectives crystallise around the aim of achieving broad monetary stability in an economy, which can be defined primarily as an environment in which inflation, if it exists, is sufficiently low as to be ignored by economic agents.

The current mission statement of the South African Reserve Bank adopted in August 1990 makes it clear that the ultimate objective of monetary policy is to achieve price stability, i.e. to ensure that the internal and external values of the rand are stabilised as far as possible in the medium term. This view of the Bank's prime responsibility was also emphasised by the Interim Constitution of the Republic, Section 196(1) of the Constitution required the Bank to protect the internal and external value of the currency in the interests of stable and sustainable economic growth.

The Final Constitution adopted in 2003 similarly orders the Central Bank to pursue price stability in the interests of economic growth and a sound economy.

Nevertheless, the suitability of this objective for a central bank has become widely accepted only in the past two decades or so. During the 1960's and early 1970's it was generally assumed that employment could be increased by adopting stimulatory economic policies, albeit at the cost of a somewhat higher inflation rate. Since the first oil crisis in 1973, however, which produced an acceleration of inflation in most major economies, this relationship has largely broken down, and more recent empirical evidence suggests that inflation and unemployment are often positively correlated.

It is now generally accepted that monetary policies which promote higher inflation may well lead to a weaker performance of the real economy. High rates of inflation discourage savings and investment, and thereby damage an economy's potential for economic growth. Consequently, most monetary authorities around the world have come round to the view that price stability should be the ultimate objective of monetary policy. In other words, price stability is perceived to be conducive to raising the growth rate of an economy.

Many central banks in effect are now trying to maintain price stability by keeping the growth in monetary demand more or less continuously and broadly in line with the underlying growth of capacity in the economy. They are, in fact, using price stability as an indicator of stability in an economy as a whole. Robert Barro recently carried out a statistical analysis of the effects of inflation on economic growth drawn from the experience of more than 100 countries over 30 years. His main finding was that an increase in the inflation rate of 10% tends to reduce national growth rates by 0.2 to 0.3 percentage points per annum. Taking this result and using compound interest,
it can be shown that a 10 percentage point increase in the inflation rate lowers the level of real gross domestic product after 30 years by between 4% and 7%.

It is considerations of this nature which justify the interest in price stability displayed by many central banks. Nevertheless, these findings indicate that the economic benefits in the form of higher economic growth stemming from lower inflation are not as great as sometimes suggested. Sceptics in this regard are further reinforced by the fact that Barro achieved his results mainly by including many third world countries with double-digit inflation rates or more. He said that his results for countries with inflation rates averaging below 15% were not significant. His findings for countries with inflation rates averaging less than 10% showed practically no relationship with economic growth.

In most industrialised countries price stability is considered to prevail if the rate of increase in consumer prices is in the range of 0% to 2%. In other countries which suffer from higher rates of inflation, such as South Africa, monetary policy must first aim at bringing down the inflation rate before attempting to stabilise prices in absolute terms.

South Africa's inflation rate during the period from 1994 to 2003 has averaged below 10%, and consequently its harmful effects on the potential for economic growth may have been minimal. Nevertheless, the ongoing attempts to push the inflation rate lower can still be justified.

A low rate of inflation is a key factor in attracting foreign capital, which in turn affects the growth potential of the economy. Many foreign investors, in assessing the merits of foreign investment in South Africa, place emphasis upon the country having an inflation rate which is not far out of line with the average rate of inflation in the economies of its major trading partners.

Please complete Activity 6
Read the following article:

2004-11-18: MONETARY POLICY AND INFLATION: THE NEXT DECADE,
Address by Mr TT Mboweni, Governor of the South African Reserve Bank at the Conference of the Bureau for Economic Research, Stellenbosch, 18 November 2004

1. INTRODUCTION
Chairperson, ladies and gentleman, I have been asked to share my views with you today on what will happen with monetary policy in the next ten years. Looking into the future is always a hazardous undertaking. It requires a careful analysis of what has changed already and what likely changes will occur in the coming years. Such an analysis cannot only concentrate on what has happened in South Africa, but must also take into account the structural changes in the rest of the world and how these developments could perhaps affect South Africa. This is indeed a formidable task. In the next thirty minutes I will do my best to give you my view on these matters.

2. STRUCTURAL CHANGES IN THE WORLD'S FINANCIAL SECTOR
World War I and the great depression of the 1930's left the world with highly regulated capital markets and a disintegrated international financial system.
The highest priority was therefore attached to restoring multilateral payments and current account convertibility towards the end of World War II, which led to the Bretton Woods Agreement and the General Agreement on Tariffs and Trade. In the period after the war, the emphasis shifted to the liberalisation of trade and payments. Progress with these reforms was relatively slow and at first concentrated on the currency convertibility of current account transactions. In the 1980's the authorities of the industrialised countries began liberalising financial systems, which were later followed by a number of emerging-market economies. The convertibility of the capital account of the balance of payments gained further momentum with the negotiations in the World Trade Organisation to liberalise transactions in financial services.

This financial liberalisation was accompanied by a process of globalisation, i.e. a growing economic interdependence of countries became discernible through the increasing volume and variety of cross-border transactions and through the rapid and widespread diffusion of technology. New technological advances reduced transportation, telecommunication and computation costs, thus greatly increasing the ease with which national markets may be integrated at the global level.

The liberalisation and globalisation resulted in a growing interdependence of national financial markets. Although these markets still do not form a single global market, the degree of interdependence is already strong enough to have altered the environment in which monetary policy is conducted. In particular, it has affected the volume of international financial transactions. International transactions in goods and services have become considerably less important than financial transactions. The closely linked financial markets have changed the monetary transmission mechanism, and shocks that occur in one country can easily have an impact on other countries.

As a transition phase of or perhaps as an alternative to globalisation, considerable emphasis has been placed on closer international co-operation, convergence and integration since the end of World War II. Many regional economic co-operation arrangements have been formed or are under consideration. The aim of these regional arrangements is to free international trade and financial transactions between a group of countries. But many of them also want to encourage the movement of labour across domestic frontiers and the eventual attainment of political unions. The establishment of the European Union is, of course, the best example in this regard. This regional arrangement has created the largest government bond market in the world and led to the development of the euro into a major international currency.

Another important structural change in the world's financial market has been the achievement of greater price stability. Over the past twenty years the rate of inflation has declined dramatically in most countries of the world. The disinflation process was at first mainly concentrated in the industrialised countries. According to the International Monetary Fund the average annual inflation rate in the major advanced countries already started to decline from the early 1980s from 12,3 per cent in 1980 to 1,7 per cent in 2003. By contrast, the average inflation in emerging-market and developing countries continued to increase from 25,0 per cent in 1980 to 107,7 per cent in 1992, before declining sharply to 6,1 per cent in 2003. These developments brought the average rate of inflation in the world as a whole down to only 3,7 per cent in 2003.

This disinflation process has been so strong that some countries even experienced declines in their average price indices. Consumer prices have actually been declining in Japan and Hong Kong for quite a while, while some other countries such as China recorded decreases for a short period.
As could be expected, disinflation to low positive values has been accompanied by a corresponding decrease in short-term interest rates to low levels.

Finally the financial sector, just like all other activities in the world, has been severely influenced by the revolution experienced in information technology and telecommunication. In central banking the advances made in information technology and telecommunication have particularly led to a more efficient payment system catering for real-time gross interbank settlement. New developments in commercial banking include automated teller machines, credit and debit cards, telephone and inter-net banking, intelligent cards and card reading devices. In the 1990s a further advance in technology made it possible to store monetary value on a silicon chip embedded in a plastic card or in a personal computer. This was the first step in the development of electronic money or e-money. Initially it was believed that this development would lead to a quick and dramatic change in the way that payments are made. Such a change would have required large investments in infrastructure and the general acceptance of this new payments method by the public. It is thus not surprising that it did not take off in the way predicted by some analysts. However, initial setbacks to new innovations are a common experience and it is quite possible that the public could eventually be more willing to accept this new innovation.

3. EFFECTS ON SOUTH AFRICA'S FINANCIAL STRUCTURE

These changes in the rest of the world did not affect South Africa's financial sector to any great extent during the 1980s, i.e. in a period in which the country became increasingly isolated from the rest of the world as a result of trade boycotts, embargoes and financial sanctions. The subsequent transition to a new political dispensation and the normalisation of the country's international relations completely changed this situation. These circumstances forced the South African financial sector to move from a relatively isolated position to a world that had changed in many ways from the time when our financial institutions were still actively involved internationally.

To cope with the challenges faced in this new environment it was important to improve the functioning of the domestic financial markets and to reintegrate them in the world economy in an orderly way. Great efforts were accordingly made to bring the rules and regulations applying to financial institutions in line with international norms and standards. The re-entry of South Africa in an integrated financial community also made it important to reconsider the strict exchange control rules applicable at that time. The country's limited foreign exchange reserves prevented the immediate removal of all exchange control measures, which caused the authorities to opt for a policy of a gradual relaxation of capital account transactions.

From 1994 South African financial institutions started operating on an increasing scale in major international financial centres and opened branches or subsidiaries in other African countries. At the same time foreign financial institutions were encouraged to conduct business in South Africa by the creation of a level playing field between local and foreign service providers. In addition, the regulatory authorities actively encouraged the development of appropriate clearing, settlement, ownership-transfer and market information systems, and proper intra-market and cross-market risk management systems.

This restructuring led to a sharp increase in the involvement of foreign banks and other non-residents in domestic financial markets. In particular their transactions on the Bond Exchange and the Johannesburg Stock Exchange increased considerably.
This participation of non-residents contributed to the increase in the turnover of these two markets. It also caused more volatility in long-term interest rates because investors quickly altered their positions with changes in domestic and international conditions, while prices on the Johannesburg Stock Exchange became even more susceptible to changes in the prices on the stock exchanges of major financial centres.

Moreover, the normalisation of relations with the rest of the world led to a turnaround in the international financial flows of South Africa from a net outflow of about R45 billion in the period from 1985 to 1993 to a net inflow of nearly R204 billion since 1994. At the same time the volatility in these financial flows increased. Although the country generally experienced an inflow of capital from the rest of the world, the magnitude of these inflows varied considerably from year to year. For example, a net financial inflow of about R29 billion in 1998 was followed by inflows of just more than R7 billion in each of the next two years, before these inflows increased again to about R30 billion in 2002 and R63 billion in 2003.

Most emerging-market economies now seem to experience large and volatile capital movements. Despite considerable efforts to make South Africa a more investor-friendly country, it can safely be assumed that fluctuations in capital movements will continue to be a feature of our economy in the future. This volatility will not only be influenced by domestic developments, but also by events in the rest of the world.

The volatile capital movements brought about large swings in the exchange rate of the rand not only against individual currencies but also on a trade weighted basis. For instance, in 2000 and 2001 the nominal effective exchange rate of the rand declined by 13 percent and 39 per cent, respectively, before it increased again by 24 per cent in 2002 and by 44 per cent in 2003. These fluctuations have complicated the implementation of monetary policy. In particular, monetary policy was dominated in 2002 by inflationary pressures arising from the substantial depreciation in the external value of the rand in late 2001, combined with a sharp rise in international oil prices as well as in domestic food prices. These external shocks were responsible for a surge in the twelve-month rate of increase in the CPIX from a low of 5.8 per cent in September 2001 to a peak of 11.3 per cent in October 2002. Subsequently, the appreciation of the rand from the beginning of 2002 again had to be carefully taken into consideration in the formulation of monetary policy.

The fluctuations in the exchange rate of the rand clearly illustrated the need for structural adjustments in the foreign exchange market in South Africa. The Reserve Bank accordingly concentrated on eliminating its negative net open foreign reserve position and its oversold forward book. With the success achieved with these objectives, the focus of the Bank has now shifted to a gradual strengthening of the official foreign exchange reserves. Since the end of 2002 the official foreign exchange reserves of the country have increased from US$7.6 billion to US$13.0 billion at the end of October 2004. The higher foreign exchange holdings should help to stabilise the external value of the rand.
4. IMPLICATIONS FOR MONETARY POLICY

Taking these changes in the world and more specifically in South Africa into consideration, we now come to the crucial question on how will monetary policy be affected or what will happen to monetary policy in the next ten years. More in particular I want to concentrate on three questions in this regard, namely:

(1) Will monetary policy still be effective?
(2) What should the primary objective of monetary policy be?
(3) What monetary policy framework should be applied?

4.1 The effectiveness of monetary policy

As in the rest of the world, e-money has not really taken off in South Africa. Although several potential products have been evaluated by the Reserve Bank, no roll-out on a significant basis has yet occurred. The failure of e-money to meet expectations can possibly be ascribed to the fact that cash remains a trusted and very convenient payment mechanism, debit and credit cards are widely used and e-money products generally do not allow for person-to-person payments. However, it is conceivable that this could change in the future and that e-money could to an increasing extent become a substitute for banknotes and coin. As Benjamin M. Friedman (1999) has pointed out it is possible, albeit at present highly unlikely, that e-money could be used as a means of payment as well as settlement and therefore erode the role of currency and reduce banknotes and coin in circulation.

Friedman also stated that the size of base money (currency in circulation plus the balances of banks at the central bank) could decline in future because of the declining role of banks in advancing credit to the non-bank private sector. If bank credit extension to the private sector decreases, less deposits are created. The reserves that banks are required to hold at the central bank are then smaller, which reduces base money.

Securitisation and the liberalisation and globalisation of South Africa’s financial markets have led to a declining role of banks in the advancement of credit to the non-bank private sector. As already indicated, South African organisations are now more easily able to obtain financing from abroad than they were before 1994. Many private sector companies have also started to make increasing use of the bond market to raise funds for development purposes. Although this disintermediation has not led to a decline in reserve requirements of banks, it has affected the growth of base money.

Friedman further indicated that private bank clearing mechanisms could be developed that would further reduce base money. Mervyn King (1999) also pointed out that there is a possibility that the demand for settlement balances could eventually be eliminated by the development of electronic networks allowing payments to be settled without the involvement of the central bank.

These arguments led Friedman to the conclusion that the central bank in the future will become "an army with only a signal corps". Central banks will only be able to indicate to the private sector how they believe monetary conditions should develop, but will be unable to do anything about this if the private sector has a different view.
It nevertheless seems highly unlikely that the effectiveness of monetary policy will decline in South Africa in the next ten years because of the increased use of e-money, the liberalisation and globalisation of our financial markets or the development of private banking clearing mechanisms. At most these factors should only have a limited impact on the effectiveness of monetary policy. As Woodford (2000) stated, the effectiveness of monetary policy is not dependent "upon a mechanical connection between the monetary base and the volume of nominal spending, which is then presumably dependent upon a need to use base money as a means of payment". In fact, in South Africa the supply of money is endogenously determined. The repo rate is the operational variable of the Reserve Bank and this rate is not affected by the size of base money.

4.2 The primary objective of monetary policy

Having determined that monetary policy should remain effective in the coming ten years, what should the primary objective of monetary policy be in South Africa?

It is now generally accepted all over the world that the central bank’s responsibility is to ensure price stability. As already indicated, considerable success has been achieved with the attainment of this objective and in the advanced countries of the world price stability has been maintained for a relatively long period. As a consequence, many of the central banks of these countries seem to have become less engrossed with combating inflation and have again moved somewhat in the direction of fine tuning economic growth. Many economists are of the opinion that this is the right approach. For example, in a recent article of Carl Walsh (2003) he states that modern central banks must "recognise that achieving and maintaining low inflation cannot be their only objective. Monetary policy has important short-run effects on real economic activity and there is, therefore, a role for monetary policy to play in conducting stabilisation policy". The danger of such an approach is, of course, that central banks could concentrate too much on expansionary policies at the cost of maintaining price stability.

Despite the fact that South Africa has only been able to maintain low inflation over a relatively short period, it can be argued that the Reserve Bank should now give more attention to the promotion of economic growth. It is true that short-term interest rates do have some affect on long-term interest rates which, in turn, is an important determinant of the growth in investment and production. However, it must be realised that reductions in short-term interest rates do not always lead to a reduction in the cost of capital. If it is generally expected that lower levels of short-term interest rates will lead to higher inflation, long-term interest rates are bound to rise. Monetary policy may therefore be less effective in having the desired impact on real economic activity over the short term than generally believed. At the same time it must be admitted that the actions of central banks do have some affect on the growth of domestic product over the short term.

Although monetary policy measures affect real economic activity over the short term, long-term economic growth can only be achieved if production capacity and productivity increases. Besides increases in employment, the expansion in production capacity requires additions to capital stock in the form of net fixed investment.
Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues.

**Primary Agriculture**

**NQF Level 4**

**Unit Standard No: 7468**

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Productivity refers to the efficiency with which labour, capital and other inputs are combined and used to produce goods and services of a specific quality in order to satisfy the needs of the market. Technological progress, improving the quality of the labour force and the more productive utilisation of resources are among the factors needed to increase productivity.

Monetary policy measures cannot directly influence the factors on which long-term economic growth depend. Monetary policy has the most control over changes in the overall price level and therefore on the long-run impact of inflation on economic growth. But it should at least not discourage and preferably rather encourage domestic saving, investment and the inflow of foreign capital to promote economic growth. Monetary policy should also not stand in the way of the optimal allocation of resources and the most efficient utilisation of these resources in business enterprises, because this could lower the potential growth in output. All in all, monetary policy should therefore not add to the risks that normally confront private business or dampen technological innovations.

The South African Reserve Bank believes that the best way that monetary policy can contribute to the important objective of sustained economic growth is to achieve and maintain price stability. The maintenance of price stability should continue to be a major objective of monetary policy particularly now that we have achieved some success in bringing the inflation rate down within our inflation targets. If we are unable to do this, the credibility of monetary policy will be questioned, which could have a severe affect on the effectiveness of monetary policy measures in the future. As Carl Walsh (2003) has indicated "the three most important ingredients to a successful monetary policy are credibility, credibility and credibility".

There are many convincing arguments why price stability should be regarded as a prerequisite for sustainable economic growth. All modern market-orientated economies are based on the extensive use of money as a unit of account, as a means of exchange and as a store of value. Money that deteriorates in value all the time cannot fulfil these functions effectively. High inflation discourages savings and foreign investment, on which economic growth is highly dependent.

Not only is the supply of funds for investment reduced by high inflation, but the flow of existing saving to risk capital is distorted. The finance that do become available is invested in such a manner where they can provide the best protection against inflation, and not necessary where they could be the most productive and lead to employment creation. In the past when we experienced high inflation, large amounts of investment in South Africa were made in the construction of office blocks, shopping centres and expensive housing, which cannot be regarded as the most productive forms of investment and which probably lowered the growth potential of the economy. Inflation accordingly undermines the efficiency of the pricing system and does not lead to the optimum allocation of production resources.

**4.3 The monetary policy framework**

In the pursuit of price stability the South African Reserve Bank and the central banks in many other parts of the world have found that the inflation targeting monetary policy framework has proved to be highly effective. In particular, inflation targeting has led to a better co-ordination between monetary policy and other economic policies than with other monetary measures applied in the past. This is largely owing to the fact that the Government is responsible for the determination of the inflation target in South Africa in co-operation with the Reserve Bank.
This target is therefore determined in a structured manner, and taking into consideration the other economic objectives of government. After the determination of the target it is the Reserve Bank's responsibility to see that it is achieved, i.e. the Reserve Bank has instrumental independence but not goal independence. It is therefore surprising that the Bank is sometimes criticised of being over obsessed with the attainment of the target at the detriment of economic growth. Since the target is established in a co-ordinated way, it should in theory form part of the government's objectives for economic growth and employment creation. Even more importantly, after the target has been established, it is the Reserve Bank's task to see that it is achieved.

Inflation targeting has the further advantage that it provides a nominal anchor to inflation expectations if monetary policy is perceived to be credible. This facilitates a reduction in inflation and should form the basis for future price and wage setting. It is a transparent policy framework, because the target is publicly announced. This announced target provides the basis of accountability of the central bank. This disciplines the actions of the central bank and leads to a better understanding among the public why monetary policy decisions are made.

In view of these advantages of inflation targeting in comparison with other monetary policy frameworks, there seem to be little reason to start applying a new framework. The authorities will accordingly continue to apply inflation targeting as the monetary policy framework of South Africa in the next ten years and at most probably only refine the system further to ensure that it continues to function efficiently.

5. CONCLUSION

My general conclusion is therefore that the recent major structural changes in the world and in South Africa will have little effect on the determination and implementation of monetary policy in the coming years. It is true that vast developments have taken place in information technology and telecommunication and that we could probably expect further significant changes in the next ten years which will have a major impact on our lives. The process of liberalisation, globalisation and integration is also bound to change our lives even further. It seems unlikely however, that these changes will affect the efficiency of monetary policy. In this expected changed world the South African Reserve Bank will continue in its quest for the achievement and maintenance of price stability by applying an inflation targeting monetary policy framework.

REFERENCES


1. Summarise the address of the Governor of the South African Reserve Bank made on 18 November 2004. (Min 1 A4, max 2 A4 pages.)
Please complete Activity 7
You have to debate aspects of the national and global economy. There are a number of articles that were obtained from Reuters, Business Day, Sanlam, and Old Mutual on 19 November 2004. Use them to prepare for a debate. Record your notes of your preparation in the space provided at the end of the articles.

Resurgent oil jumps ahead of northern winter
By Neil Chatterjee (Reuters – 19 Nov 2004)
LONDON (Reuters) - Oil prices leaped more than a dollar on Friday on renewed concern over tight supplies of distillate fuels in Europe and the United States ahead of the northern hemisphere winter.

U.S. light, sweet crude gained $1.53 to $47.75 a barrel, stemming a decline that has dragged prices down $8 from record highs since late October. London IPE Brent jumped $1.48 or three percent to $44.20 a barrel.

Friday's jump renewed a rally that has added 45 percent to prices this year as rising world fuel demand strains supplies of refined products such as gasoline, diesel fuel and heating oil.

Dealers are concerned about the adequacy of heating oil inventories, which are significantly below last year's levels in the top markets of the United States, Germany and Japan. U.S. supplies are 16 percent less than year-ago figures.

London IPE gas oil, used as a basis to price distillates such as heating oil, added $23.25 or over five percent from the previous day's settlement to $447.00 a tonne.

Gas oil has gained $47 a tonne -- more than 11 percent -- in the last four trading sessions, dragging up refining profits and spurring physical oil buying to staunch a three and a half week slide on crude futures.

"It's because we've had such an explosive rise in heating oil prices -- I don't think we've ever seen such a dramatic increase in the spread between heating oil and crude," said Kevin Norrish of Barclays Capital.

The rally comes after prices plunged nearly 17 percent from record highs in late October, as signs of building crude supplies and slowing demand growth drove investors out of energy and into financial or equity markets.

WINTER WEATHER WORRIES
An early or severe winter could cause a price spike with household demand for heating. Continued mild weather, however, would give refiners more time to replenish stocks, providing a cushion against future cold snaps.

The U.S. National Oceanic and Atmospheric Administration said on Thursday in a revised forecast that winter would be likely to bring warmer-than-normal conditions in the West and colder temperatures in the East, including the heavy-consuming Northeast.

Demand for oil products on physical markets has been strong this week. Traders said China, the world's second-largest energy user, had boosted diesel imports to their highest levels since early 1999 to make sure supplies do not run short as in 2003.

Chinese oil importers have booked at least 450,000 tonnes of diesel for November -- more than four times October's estimated volume -- hoping to avoid the kind of supply crunch that forced hundreds of gas stations to ration sales a year ago.

Oversupply on crude markets has also focused attention on the OPEC producers cartel, which has been pumping near flat out at near 30 million barrels per day since the late summer.
Venezuelan Energy Minister Rafael Ramirez said late on Thursday his country would support a cut in oil production by oil cartel OPEC when the producers' group next meets on December 10.

The minister said OPEC member Iran had already made a proposal to cut production at the upcoming meeting. Some producing nations are concerned that a potential build-up in crude stocks over the next few months could depress oil prices.

On Thursday the OPEC cartel revised down its expectations of oil demand growth for next year and projected a rare big winter stockbuild if the group keeps producing at current levels.

**Europe gold surges as dir wanes on Greenspan**

LONDON (Reuters) - Gold surged to its highest in more than 16 years for the sixth session in a row on Friday in Europe after comments by U.S. Federal Reserve Chairman Alan Greenspan reinforced the euro's rally against the dollar.

The dollar slumped across the board after Greenspan said appetite for dollar investments could eventually wane. A weaker U.S. currency makes dollar-priced gold cheaper for non-U.S. investors.

Spot gold surged to close in Europe at $446.75/447.50 -- its highest since July 1988 -- and up compared with $442.95/443.70 quoted late in New York on Thursday. The metal was fixed on Friday afternoon at $445.60.

"The dollar weakened again and gold took off just before the fix, mainly on fund buying," a dealer said.

Gold has now gained more than seven percent since the beginning of this year.

**LIQUIDATION THREAT**

Analysts said gold's bull run would probably continue while the dollar remained weak, but raised the possibility of a sell off due to high speculative exposure.

"The dollar is looking really, really weak and with all the comments that we've seen from Greenspan -- this points to the dollar getting even weaker and that will lift the gold price," UBS Investment Bank analyst John Reade said.

Reade said the market's bullish glow would fade at some point however, as speculators became increasingly overexposed on New York's COMEX gold futures market.

"You don't stand in the way of the falling dollar, but there will be a shakeout at some stage," he said, adding that gold was unlikely to outperform the euro if the dollar continued to weaken substantially.

The euro was last at $1.3025, off its all-time high of $1.3074 on Thursday. Analysts said gold was still within sight of its next upside target of $450 -- last seen in June 1988.

Traders have also attributed gold's recent bullish streak to hype generated by the launch of a new U.S. investment product on Thursday.

StreetTRACKS Gold Shares, a bullion-backed exchange-traded fund, debuted on the New York Stock Exchange on Thursday, with the aim of broadening investor access to the market.

San Francisco-based Barclays Global Investors also filed a registration with the Securities and Exchange Commission for iShares COMEX Gold Trust, which will mimic the price of COMEX gold futures.

Silver was seen broadly consolidating, tracking gold and currency moves. Spot silver was quoted at $7.57/7.60, up from New York's $7.52/7.55.
Platinum weakened to $852.00/857.00 from New York's previous $857.50/862.50. Palladium was at $214.00/218.00 from $214.50/220.50.

**S.African stocks end soft, pause after gains**

JOHANNESBURG (Reuters) - South African stocks retreated on Friday led by resource stocks with Anglo American Platinum down nearly five percent on a firmer rand, but mobile operator MTN jumped on strong earnings.

"It's jitters over the rand, a softer rand didn't happen and no one wants to stay long if the rand is at these levels. Some profit-taking took place in resources," a trader said. Angloplat, the world's number one platinum producer, shed 3.91 percent to stand at 220 rand after the rand rose to 6.03 from 6.04 late on Thursday and was likely to strengthen, back to the 5.94/dollar four-month peak reached this week. Platinum prices also eased. Angloplat cut its expansion target last year due to a strong rand and analysts fear current rand levels could hurt profits and force another cutback.

Impala Platinum Holdings Ltd (Implats), the world's second biggest platinum producer, lost 2.67 percent to 510 rand.

The JSE top 40 index of blue chips eased 0.24 percent to 11,169.90 points, while the all share index fell 0.13 percent to 12,337.10 points.

Gold miners also tumbled, with AngloGold Ashanti weakening by 2.11 percent to 243.49 rand. Hostile takeover predator, Harmony Gold shed 1.86 percent to 68.65 rand. Harmony's takeover target Gold Fields edged down 0.69 percent to close at 89.08 rand while the gold mining index slipped by 1.3 percent.

Luxury house Richemont, which makes Cartier watches and Lancel handbags, reversed the previous day's gains, losing 1.06 percent to 18.75 rand on profit-taking. Its share had surged after it lifted first-half profits.

British property firm Liberty International was down 1.53 percent to 96.20 rand, and First Rand dipped 1.43 percent to 12.40 rand.

The bank index shed 0.42 percent, with most other bank shares steady, and Absa, a takeover target of British banking giant Barclays ticked up 0.29 percent to 69.60 rand ahead of its half-year results on Monday.

Africa's biggest mobile operator, MTN, was the biggest gainer on the day, charging up 3.57 percent to 34.50 rand, after unveiling a 34 percent jump in first-half profit on Thursday. It attributed its profits to solid subscriber growth in Nigeria and cost cuts in South Africa, promising further expansion abroad.

Leading South African insurer Old Mutual Plc surged 1.65 percent to 14.18 rand after posting solid second half earnings, which it said would last into 2005. Steinhoff, South Africa's largest household goods maker bounced up 1.39 percent to 11.70 rand. Last week, Steinhoff bought a 44 percent stake in transport group Unitrans for about 935 million rand from construction firm Murray & Roberts.

**S.Africa's rand firmer on dlr, waits for G20 signals**

JOHANNESBURG (Reuters) - South Africa's rand nosed stronger in quiet trade on Friday as the dollar slipped, but traders said volatility was possible after the weekend's G20 meeting in Berlin.

The dollar fell after Federal Reserve chief Alan Greenspan said the U.S. current account could not continue to widen indefinitely at its current pace, and given the size of the trade gap, investor appetite for U.S. assets would likely cool.
Traders say comments over the weekend from finance ministers and officials at the G20 industrialised and developing nations meeting could provide the impetus for the rand to break through 5.94/dollar, a 4-month peak reached on Thursday. That would put it on target to test 5.87 to the dollar -- last scaled on July 19, taking the rand to its best levels since January 1999. Its gains this week were driven mainly by the dollar's dive to a record low of 1.3074 to the euro.
The euro was trading at $1.3046 at 1500 GMT, and the rand was at 6.0175/dollar versus 6.04 late on Thursday.
"If the dollar breaks through its lows this weekend then the rand could also go through its levels," the trader said.
Profit taking cut back the rand's rally on Thursday. The strong rand is making life difficult for South Africa's exporters, particularly the crucial mining sector.
Traders said the market would keep a close eye on inflation data due next week for clues to the outlook for interest rates, with speculation mounting of another cut in December given the positive impact the rand's strength will have on inflation.
The targeted CPIX index is seen to have risen by an annual rate of 4.1 percent in October, well up from a low of 3.7 percent in the previous two months but still well inside its official target range.
The anticipated rise is a result of higher oil prices during the month, but as these have dropped sharply there is scope for inflation to follow suit in the coming months, analysts say.
Traders said a rally in South African bonds looked like calming down, as the market had already priced in a 50 basis point interest rate cut at the Reserve Bank's December Monetary Policy Committee meeting.
The yield on the benchmark 153 due 2010 was down three basis points at 8.29 percent having hit a record low of 8.25 percent on Thursday. The yield on the 194 due 2008 was up five basis points at 7.87 percent.
"We've priced the cuts in and there's a bit of resistance at this level," said a trader.

**Exporters not feeling rising rand's bite yet**

*Business Day, 19 Nov 2004*

EXPORTERS said they were not yet feeling the pinch from the rand's rise to a four-month high this week, with expectations of an interest rate cut likely to ease concerns in the struggling sector.
The rand maintained its strength for the second day in a row yesterday, trading at R5,96 against the dollar for most of the day, before moving back up to the R6 level.
Exporters said yesterday that although they were not feeling the effect of a stronger currency yet, a rand trading between R6,50 and R7 against the dollar would help them to be more competitive.
A cut in interest rates at the Reserve Bank's monetary policy committee meeting next month would help ease the burden on exporters, but companies should not rely on a weaker currency to boost profits, analysts said yesterday.
The latest Reserve Bank quarterly bulletin shows a deficit of R5,5bn in the trade account in the second quarter the first time in 22 years that imports have totalled more than exports. A strong rand does not bode well for exporters' bottom line, since they make their revenue in dollars, but cover their costs in rand.
'One has to start expecting this (strong rand) could be a long-term phenomenon driven by external factors beyond our control," Absa treasury economist Chris Hart said. Econometrix Treasury Management analyst Michael Keenan said exporters could not rely "on a currency to keep your shop open". "Adjusting to a strong rand will make local firms more efficient, and more sustainably competitive globally," Keenan said. Gold mining company Harmony said yesterday that the higher dollar price of gold, which has been trading at a 16-year high of about 440/oz, had helped to partially offset the gains in the rand. "Fortunately, the higher dollar price of gold has to an extent negated the impact of a stronger rand. We are now receiving a higher price in rand per kilogram than we were in the last quarter," Harmony marketing director Ferdi Dippenaar said. He said a rand at about R6,50 against the dollar would be "a lot easier" on exporters. Keenan said the strong gold price would also help limit job losses in the mining sector. Manufacturers may struggle, though, and the only way for them to respond would be to reduce costs. "A cut in interest rates would help to take out some of the sting," Hart said. Capital equipment manufacturer Bell said a rand of between R7,50 and R8 against the dollar would be more competitive. Doug Rhind, Bell's financial director, said the strong rand would hurt its exports, and increase competition from European imports. **Fiscal policy, virtuous circle set to sustain growth**

*Business Day 19 Nov 2004*

STRONGER economic growth in SA was sustainable in coming years, boosted by a more expansionary fiscal deficit and low interest rates, leading economists said yesterday. Gross domestic product growth was set to top 4% next year, driven by strong spending and investment, according to the University of Stellenbosch's Bureau for Economic Research (BER). Economist Mike Schussler forecasts that growth will rise above 4% over the next two years, with the record growth in economic activity likely to continue until 2010, when SA hosts the Soccer World Cup. Schussler said that SA's economic upswing was sustainable since it was not based on low or negative real interest rates or on a fiscal stimulus as in Europe. Instead stronger growth in SA was based on a virtuous circle of higher labour productivity leading to lower inflation, which lowered the cost of capital. This in turn lead to firms investing more in capital equipment, which improved labour productivity, he said. Although growth would be higher next year compared with this year's expected 2,9%, exports would remain sluggish next year because of the rand's strength, said the BER. The bureau said yesterday that consumer spending would slow next year to around 3,7% from 4,1% this year, while investment was set to accelerate to 9% next year from 8,4% this year. The rand was expected to weaken to around R7,50-R8 against the dollar next year, given SA's widening current account deficit, said the university’s bureau.
Old Mutual Market Watch – 1 October 2004

The August CPIX inflation rate of 3.7% was again lower than market expectations. Excluding the impact of petrol prices, CPIX inflation was only 3.5%. Clearly the benefits of the strong rand and lower food prices are still being felt. The high oil price is a concern for inflation, although the rand is helping to blunt the impact on petrol prices to some extent. We expect inflation to remain relatively subdued over the next several months and it should easily remain within the 3% to 6% target range throughout next year.

Local demand growth remains strong, with recent car and retail sales data confirming booming consumer spending. Consumer finances remain very healthy, with strong disposable income growth, low interest rates and resultant low debt servicing levels. In addition, the production side of the economy has responded nicely to strong demand growth. The prospects for growth into 2005 remain very favourable, with firm foreign demand, low local interest rates and expansionary fiscal policy.

The Reserve Bank could decide to cut interest rates again, given the recent performance of inflation, the still positive outlook for future inflation, the strong rand and the fact that the underlying (i.e. excluding airplanes, the corvette and extra oil imports) current account deficit in the second quarter was not as bad as the headline number of a 3.8% of GDP suggested. In addition, the current account deficit is still easily financed. However, the high oil price and strong demand growth (together with the resultant booming conditions in credit extension) could counter the reasons for such a rate cut. All told, it is a tough call as to whether rates will be cut or not and the decision could depend heavily on the rand and oil price.

Sanlam Economic Report – November 2004

Inflation

The annual percentage change in the CPIX, which is the Consumer Price Index excluding the interest rate on mortgage bonds, for the historical metropolitan and other urban areas is 3.7% at September 2004 (i.e. the CPIX at September 2004 compared with that at September 2003).

This rate is the same as the corresponding annual rate of 3.7% at August 2004. From August 2004 to September 2004 the CPIX for the historical metropolitan and other urban areas increased by 0.3% and the seasonally adjusted index increased by 0.4%.

The latest inflation figures have again been lower than expected. This now brings the number of inflation releases below expectations to seven and economists now forecast a strong possibility of a further rate cut at the Monetary Policy Committee’s (MPC’s) monetary policy meeting in December if the oil price reverts back to normal levels in the mean time. The MPC decided to leave rates unchanged at 7.5% at its meeting this month.

The Rand and the Economy

The Rand appreciated to its best level (R6.06/$) since 23 July but eased slightly to R6.14 at month-end. The strong Rand has protected the economy from inflationary pressures and aided GDP growth especially from the manufacturing sector. This manufacturing growth should translate into more jobs and increased economic growth over the next few quarters.

The South African economy has shown positive growth for a record 61 straight months and economists have indicated that this record can be extended further. The one obvious threat to this position is the effect of another terrorist attack on the fragile oil price.
The Association of Collective Investments data shows that investments in foreign currency denominated equity funds attracted R2.1 billion, which was double the second quarter net inflow. Although the bulk of this increase is from institutional clients, it seems South-Africans are once again testing the international waters.

The Gold price had a somewhat volatile month dropping from $418 to $411 in the first week of the month, but staged a healthy recovery reaching a high of $428 per ounce near month-end.

The Local Equity Market
The JSE All Share Index reached an all-time high of 12115 points in the first week of October, but the subsequent strong Rand and its impact on exporters halted the last quarter's phenomenal growth.
The Index ended the month almost two percent down taking direction this time from the Rand and international markets that succumbed to high oil prices.
The JSE All Share Index was dragged down by the Resources sector, which makes up roughly 30% of the index. Resources ended the month almost 10% down because most of the companies receive their income in US dollars. It is interesting to see that most of the dual-listed stocks were up on the foreign exchanges, which suggests that the stronger local currency was primarily to blame for the lower All Share Index.
The Financial sector has continued its run of six consecutive positive months and the Industrial sector is following closely with 4 positive months to place the index up 19% year-on-year.
Local stocks continue to be supported by low, stable inflation and firm commodity prices. The question on everyone's lips is how long can the good times last. This will depend on the oil price, the currency and the MPC's December interest rate decision.

The Global Economy
The oil price has once again taken the limelight and hit an all-time high of $51.38 per barrel of Brent Crude in the last week of October when US data releases suggested an increase in yearly deficits of heating oil inventories. A cold Northern Hemisphere winter could drive the price further up if demand doesn't decrease elsewhere. US Federal Reserve Chairman, Alan Greenspan, commented that current levels would have an economic impact, but this should not be as detrimental to growth and inflation as the oil price spikes in the seventies.
This month's sharp increase was driven by double-digit demand growth in China and the effect on supply of strike action in Nigeria.

The United States
Non-farm payroll employment increased by 337,000 in October, and the unemployment rate was about unchanged at 5.5 percent according to the Bureau of Labour Statistics of the U.S. Department of Labour. Construction employment rose sharply over the month, and several service-providing industries also added jobs. These higher-than-expected figures could indicate that the recent slowdown is over, but the real test will come once the hurricane effect fades.
The US economy grew at an annualised pace of 3.7% in the third quarter, 0.4% higher than in the second quarter, but marginally lower than predicted. Growth in GDP was aided by strong consumer spending but could not overcome the drag of disappointing inventories by businesses and the large trade deficit.
The markets were down for the first half of the month, but a recovery in the insurance and technology sectors helped the major indices end the month in the black. Investors were anxiously awaiting the outcome of the presidential elections in the last week of October.

China

China’s emergence as a budding economic superpower and its insatiable demand for raw materials has benefited commodity exporting economies, but has also placed increased pressure on the oil price. The People’s Bank of China raised interest rates for the first time since 1995 to 5.58% in an effort to cool down an economy that has experienced nominal growth of more than 9% per annum in the year thus far. Analysts say that another increase early next year is likely.

Japan & The Far East

Japan’s Nikkei 225 was the only major international equity market that could not overcome pre-US election jitters and ended the month 1.95% down. The boom in China is fuelling the growth in the rest of Asia and the regional markets are thus taking direction from the world’s second largest economy.

The UK & Europe

Central banks in Europe and the UK all left interest rates unchanged after monetary policy meetings this month. The Bank of England based the decision on the cooling housing market and slowing domestic demand. The interest rate in the Eurozone is still considered uncomfortably low at 2% but economic growth is continuing to show signs of deterioration. The Euro’s strength could become a threat to export competitiveness, but is also helping offset potential inflation from high oil prices.

No. 233 - September 2004

Quarterly Bulletin

Introduction

During the first half of 2004 the world economy continued along its stronger expansion path which started around mid-2003. This occurred despite disappointing growth in Japan in the second quarter of 2004 and tentative signs that the steps taken by the Chinese authorities to rein in growth were successful. Nevertheless, overall activity levels rose further and with international trade volumes expanding briskly, commodity prices remained high.

In the third quarter of 2004 the price of crude oil reached levels previously observed 14 years earlier around the time of the Gulf War. Strong world demand for petroleum and petroleum products was complemented by fears of supply disruptions. Against the background of fairly accommodative monetary and fiscal policies in most parts of the world, this contributed to an acceleration in inflation – quite modest in most instances, but more noticeable in a number of Asian economies. In the SADC region inflationary pressures are expected to subside somewhat on account of sustained policy discipline and improved food supply conditions in most parts of the subcontinent.
While levels of short-term interest rates generally remained fairly low, a number of central banks pre-emptively started raising interest rates from late 2003 in order to contain future inflation. Having maintained the federal funds target rate at 1 per cent since 2003, the Federal Open Market Committee in the United States raised the target policy rate by 25 basis points in June 2004 and by a further 25 basis points in August.

Economic activity in South Africa picked up further in the second quarter of 2004, with the real gross domestic product expanding for the twenty-third consecutive quarter – the longest period of uninterrupted quarter-to-quarter growth since quarterly data became available in 1960. Supported by lower interest rates, a moderately higher budget deficit and favourable international terms of trade, the annualised pace of growth accelerated to 4 per cent in the second quarter of 2004 from an upwardly revised 3½ per cent in the first quarter. The growth trajectory has steepened noticeably since the second quarter of 2003, with each quarter's growth rate being higher than the one preceding it.

The improvement in the economic growth rate in the second quarter of 2004 was broadly based. Growth in the primary sector accelerated on account of an improvement in agricultural output, while higher growth in production in the secondary sector was led by manufacturing. In the tertiary sector growth was maintained at a brisk pace, with real output originating in the transport and communication subsector rising most noticeably. As in the first quarter, all sectors and subsectors registered increases in real output in the second quarter of 2004.

The pace of expansion in real gross domestic expenditure was more than three times as fast as that of gross domestic production in the second quarter of 2004. A sharp acceleration in inventory accumulation in the second quarter contributed to this divergence; an important element in this build-up was the exceptionally high quantity of crude oil which was imported and added to inventories. Growth in domestic final demand, while remaining brisk, decelerated somewhat in the second quarter of 2004. Real gross fixed capital formation, while losing some momentum following the very high purchases of capital equipment by public corporations during the first quarter, still rose at a rate of more than 10 per cent in the second quarter. Growth in real final household consumption decelerated marginally as expenditure on semi-durable and durable goods lost some of its earlier momentum. Another corvette – the third in as many quarters – was acquired by the South African Navy during the second quarter of 2004, but growth in real government consumption expenditure moderated slightly.

South Africa's export volumes rose considerably in the second quarter of 2004, following a protracted lull since mid-2001 when the world economy moved into growth recession. Growth in mining exports was led by platinum and coal, while the volume of manufacturing exports also recorded a sizeable increase as foreign demand strengthened and producers started to come to terms with the recovery in the exchange rate. Import volumes increased even more briskly than exports as a number of aircraft, the abovementioned corvette and exceptionally large quantities of crude oil were imported. Accordingly, despite the favourable terms of trade, South Africa recorded the first trade-account deficit in 22 years and a current-account deficit of nearly 4 per cent of gross domestic product during the second quarter of 2004.
The deficit was again comfortably financed by capital inflows, enabling the Reserve Bank to continue its accumulation of foreign exchange reserves. The effective exchange rate of the rand continued its upward trend, resulting in further year-on-year declines in the rand prices of imported goods at the production level. Together with prudent financial policies this resulted in CPI inflation remaining within the target range; July 2004 was the eleventh consecutive month in which the rate of CPI inflation fell within the 3-to-6-per-cent target range. The latest available data on unit labour cost also display rates of increase marginally below 6 per cent.

Inflation outcomes so far in 2004 were generally lower than expected, feeding back into lower expectations of future inflation. Having maintained an unchanged level of the repurchase rate for a period of eight months, at its August 2004 meeting the Monetary Policy Committee reviewed prospects for inflation and concluded that a further reduction of 50 basis points in the repurchase rate would be consistent with projected CPI inflation remaining in the target range. When this reduction was announced, the exchange rate of the rand immediately depreciated; this was in contrast to the experience in 2003 when the exchange rate appeared to be oblivious to interest rate reductions. The narrower margin between interest rates in South Africa and in the rest of the world might have contributed to this greater sensitivity of exchange rate changes to interest rate movements.

There was a deceleration in growth across the spectrum of the monetary aggregates in the second quarter of 2004, after a sharp increase in the preceding quarter. This deceleration in part reflected a reversal of the exceptionally high increase in money balances at the end of February caused by coupon interest payments on government bonds and the redemption of a maturing government bond. Measured over twelve months, growth in M3 receded somewhat to levels of around 12 per cent in the period April to July 2004.

The stimulus to consumer and business sentiment induced by lower interest rates, rising house prices and rising real income was reflected in brisk expenditure growth which in turn was partly financed through rising credit extension by the banking system. Growth in asset-backed loans and advances accelerated further during the first seven months of 2004, from already high levels. The modest level of overdue loans encouraged banks to accommodate the higher demand for mortgage, instalment sale and leasing advances. The demand for other loans and advances – often seen as a sign of corporate distress borrowing – tended downward in recent months as lower interest rates and the use of non-bank funding mechanisms made themselves felt.

Higher mortgage lending by the banking sector in turn supported residential property prices whose yearly rates of increase in the first eight months of 2004 were without precedent. Nevertheless, the monthly increases in house prices have lately decelerated somewhat.

Bond yields reached a peak in June 2004 and fluctuated around a declining trend in the ensuing period as the domestic inflation outlook improved. A mild softening in global bond yields reinforced the decline in domestic yields as markets apparently discounted less buoyant global economic conditions against the backdrop of high oil prices.
South African share prices, which were rather lacklustre from March 2004, picked up from mid-August in response to the decline in the exchange value of the rand.

The authorities continued to pursue a cautiously expansionary fiscal policy. While the twelve-month growth in government revenue from taxes on income and profits in April – July 2004 was below the projected growth for the full 2004/05 fiscal year, the budget deficit remained well-contained and easily financed. Although the bulk of the deficit was financed through issues of conventional bonds in the domestic capital market, a foreign bond was also launched as well as a government bond series for retail investors. The latter bond series became available on 24 May 2004, and more than R600 million was raised by the end of August.
Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues.

Primary Agriculture  
NQF Level 4  
Unit Standard No: 7468

<table>
<thead>
<tr>
<th>Concept (SO 4)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values are calculated correctly.</td>
<td></td>
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<tr>
<td>Mathematical tools and systems are used effectively to determine, compare and describe aspects of the national and global economy.</td>
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<tr>
<td>Debating points are based on well-reasoned arguments and are supported by mathematical information.</td>
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</table>
Am I ready for my test?

♦ Check your plan carefully to make sure that you **prepare in good time**.

♦ You have to be found **competent** by a qualified **assessor** to be declared competent.

♦ Inform the assessor if you have any **special needs** or requirements **before** the agreed date for the test to be completed. You might, for example, require an interpreter to translate the questions to your mother tongue, or you might need to take this test orally.

♦ Use this worksheet to help you prepare for the test. These are **examples** of **possible questions** that might appear in the test. All the information you need was taught in the classroom and can be found in the learner guide that you received.

1. **I am sure** of this and understand it well
2. **I am unsure** of this and need to ask the Facilitator or Assessor to explain what it means

<table>
<thead>
<tr>
<th>Questions</th>
<th>1. I am sure</th>
<th>2. I am unsure</th>
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</table>
Use the checklist below to help you prepare for the part of the practical assessment when you are observed on the attitudes and attributes that you need to have to be found competent for this learning module.

<table>
<thead>
<tr>
<th>Observations</th>
<th>Answer Yes or No</th>
<th>Motivate your Answer (Give examples, reasons, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can you identify problems and deficiencies correctly?</td>
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<tr>
<td>Are you able to work well in a team?</td>
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<tr>
<td>Do you work in an organised and systematic way while performing all tasks and tests?</td>
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<tr>
<td>Are you able to collect the correct and appropriate information and / or samples as per the instructions and procedures that you were taught?</td>
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<tr>
<td>Are you able to communicate your knowledge orally and in writing, in such a way that you show what knowledge you have gained?</td>
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<tr>
<td>Can you base your tasks and answers on scientific knowledge that you have learnt?</td>
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<tr>
<td>Are you able to show and perform the tasks required correctly?</td>
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<tr>
<td>Are you able to link the knowledge, skills and attitudes that you have learnt in this module of learning to specific duties in your job or in the community where you live?</td>
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</tbody>
</table>

♦ The assessor will complete a checklist that gives details of the points that are checked and assessed by the assessor.
♦ The assessor will write commentary and feedback on that checklist. They will discuss all commentary and feedback with you.
♦ You will be asked to give your own feedback and to sign this document.
♦ **It will be placed together with this completed guide in a file as part of you portfolio of evidence.**
♦ The assessor will give you feedback on the test and guide you if there are areas in which you still need further development.
Paperwork to be done ... 

Please assist the assessor by filling in this form and then sign as instructed.

<table>
<thead>
<tr>
<th>Learner Information Form</th>
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<tbody>
<tr>
<td>Unit Standard</td>
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<td>Postal Address</td>
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Version: 01  Version Date: July 2006
Bibliography

Books:


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Acknowledgements

■ **Project Management:**
M H Chalken Consulting
IMPETUS Consulting and Skills Development

■ **Donors:**
Citrus Academy
Boland College
Weskus College

■ **Developer:**
Dr M Roets
Mr J H P van der Merwe
Cabeton Consulting

■ **Authenticator:**
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Mr M M Ratsaka
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■ **Technical Editing:**
Mr R H Meinhardt

■ **OBE Formatting:**
Ms P Prinsloo
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Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues.

Primary Agriculture  NQF Level 4  Unit Standard No: 7468

- **Design:**
  Didacsa Design SA (Pty) Ltd

- **Layout:**
  Ms A du Plessis
  Ms N Matloa
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SOUTH AFRICAN QUALIFICATIONS AUTHORITY
REGISTERED UNIT STANDARD:

Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues

SAQA US ID | UNIT STANDARD TITLE
------------|--------------------------------------------------------
7468        | Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues

SGB NAME | NSB | PROVIDER NAME
--------|-----|-----------------
SGB for Math Literacy, Math, Math Sciences L 2 -4 | NSB 10-Physical, Mathematical, Computer and Life Sciences | NSB 10-Physical, Mathematical, Computer and Life Sciences

FIELD | SUBFIELD
--------|-----------------
Physical, Mathematical, Computer and Life Sciences | Mathematical Sciences

ABET BAND | UNIT STANDARD TYPE | NQF LEVEL | CREDITS
----------|-------------------|-----------|-------
Undefined | Regular-Fundamental | Level 4   | 6

REGISTRATION STATUS | REGISTRATION START DATE | REGISTRATION END DATE | SAQA DECISION NUMBER
---------------------|-------------------------|-----------------------|---------------------
Reregistered         | 2004-12-02               | 2007-12-02             | SAQA 1657/04

PURPOSE OF THE UNIT STANDARD
This unit standard will be useful to people who aim to achieve recognition at some level in Further Education and Training or to meet the Fundamental requirement of a wide range of qualifications registered on the National Qualifications Framework.

People credited with this unit standard are able to:
- Use mathematics to plan and control financial instruments including insurance and assurance, unit trusts, stock exchange dealings, options, futures and bonds
- Use simple and compound interest to make sense of and define a variety of situations including mortgage loans, hire purchase, present values, annuities and sinking funds
- Investigate various aspects of costs and revenue including marginal costs, marginal revenue and optimisation of profit
- Use mathematics to debate aspects of the national and global economy, including tax, productivity and the equitable distribution of resources.

LEARNING ASSUMED TO BE IN PLACE AND RECOGNITION OF PRIOR LEARNING
The credit value is based on the assumption that people starting to learn towards this unit standard are competent in Mathematics and Communications at NQF level 3.
UNIT STANDARD RANGE
Range statements are provided for specific outcomes and assessment criteria as needed.

Specific Outcomes and Assessment Criteria:

SPECIFIC OUTCOME 1
Use mathematics to plan and control financial instruments.

OUTCOME RANGE
- insurance and assurance, unit trusts, stock exchange dealings, options, futures and bonds.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
1. Plans are sufficient to ensure effective control of financial instruments.

ASSESSMENT CRITERION 2
2. Calculations are carried out using computational tools efficiently and correctly and solutions obtained are verified in terms of the context.

ASSESSMENT CRITERION 3
3. Measures used for control purposes are appropriate to the need and are in line with control plans.

SPECIFIC OUTCOME 2
Use simple and compound interest to make sense of and define a variety of situations.

OUTCOME RANGE
- mortgage loans, hire purchase, present values, annuities and sinking funds.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
1. The differences between simple and compound interest are described in terms of their common applications and effects.

ASSESSMENT CRITERION 2
2. Methods of calculation are appropriate to the problem types.

ASSESSMENT CRITERION 3
3. Computational tools are used efficiently and correctly and solutions obtained are verified in terms of the context or problem.

ASSESSMENT CRITERION 4
4. Solutions to calculations are used effectively to define the changes over a period of time.

SPECIFIC OUTCOME 3
Investigate various aspects of costs and revenue.

OUTCOME RANGE
Aspects of costs and revenue include:
- marginal costs, marginal revenue and optimisation of profit

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
1. Values are calculated correctly.

ASSESSMENT CRITERION 2
2. Mathematical tools and systems are used effectively to determine and describe the relationships between the various aspects of cost and revenue.

ASSESSMENT CRITERION 3
3. Terminology is used in the correct context.

ASSESSMENT CRITERION 4
4. Reasonable methods are described for the control of costs and optimisation of profits in relation to given data.

SPECIFIC OUTCOME 4
Use mathematics to debate aspects of the national and global economy.

OUTCOME RANGE
Aspects include:
- exchange rates, imports, exports, comparative effectiveness of currency in relation to remuneration, monetary policy and the control of inflation.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
1. Values are calculated correctly.

ASSESSMENT CRITERION 2
2. Mathematical tools and systems are used effectively to determine, compare and describe aspects of the national and global economy.

ASSESSMENT CRITERION 3
3. Debating points are based on well-reasoned arguments and are supported by mathematical information.

UNIT STANDARD ACCREDITATION AND MODERATION OPTIONS
Providers of learning towards this unit standard will need to meet the accreditation requirements of the GENFETQA.
Moderation Option:
The moderation requirements of the GENFETQA must be met in order to award credit to learners for this unit standard.

UNIT STANDARD ESSENTIAL EMBEDDED KNOWLEDGE
The following essential embedded knowledge will be assessed through assessment of the specific outcomes in terms of the stipulated assessment criteria. Candidates are unlikely to achieve all the specific outcomes, to the standards described in the assessment criteria, without knowledge of the listed embedded knowledge. This means that the possession or lack of the knowledge can be inferred directly from the quality of the candidate’s performance against the standards.
• Budgets
• Terminology and definitions associated with financial situations
• Estimation and approximation
• Compound increase and decrease

Critical Cross-field Outcomes (CCFO):

UNIT STANDARD CCFO IDENTIFYING
• Identify and solve problems using critical and creative thinking:
Solving a variety of numerical and financial problems
• Use mathematics:
Use mathematics to analyse, describe and represent financial situations and to solve problems.

UNIT STANDARD CCFO COLLECTING
• Collect, analyse, organise and critically evaluate information:
Gather, organise, evaluate and interpret financial information to plan and make provision for monitoring budgets and other financial situations.

UNIT STANDARD CCFO COMMUNICATING
• Communicate effectively:
Use everyday language and mathematical language to describe relationships, processes and problem solving methods.

UNIT STANDARD ASSESSOR CRITERIA
Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:
• Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.
• Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.
• Do not focus the assessment activities on each assessment criterion. Rather make sure the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.
• The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.
• The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard. that the candidate can achieve the outcomes again and again. This means assessors...
will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent.

UNIT STANDARD NOTES

N/A

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