SOME
CHARACTERISTICS AND SHORTCOMINGS
OF
QUARTERLY GROSS DOMESTIC PRODUCT ESTIMATES
IN SOUTH AFRICA

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Abstract

Some characteristics and shortcomings of quarterly gross domestic product estimates in South Africa

From the seventeenth century attempts were made to estimate national economies. The development of the theory and practice of national accounts gained momentum during the 1940's. Under the auspices of the United Nations (UN) and the Organisation for Economic Co-operation and Development (OECD) National Accounts were further developed and culminated in the publication of the 1953 System of National Accounts (SNA). This was followed by the 1968 SNA and in 1993 the revised edition of the international System of National Accounts was published. An aggregate of the SNA such as GDP is used for monitoring and developing of economic policies.

Although important, it is also necessary to get an overview of quarterly gross domestic product estimates. The aim of the study is therefore to refer to some shortcomings and characteristics of quarterly gross domestic product estimates.

The research methodology for the study was a literary investigation. Published materials on the field of national accounts are limited and even more restricted when the emphasis is moved to quarterly national accounts. In general the sources used for the study are from international agencies dealing with the compilation of national accounts. These sources are based on the primary source namely, the SNA93, which forms the base for national accounts estimates in general.

Although quarterly gross domestic product estimates are widely use for, inter alia, economic growth rate, an early indicator of turning points in economic development and for business cycle analysis, these estimates do have some shortcomings. These shortcomings are for example the reliability of the estimates and that quarterly gross domestic product estimates are not a measurement of welfare. Despite these shortcomings, quarterly gross domestic product estimates are crucial for economic planning and decision making.

Opsomming

Sedert die sewentiende eeu is pogings aangewend om die omvang van nasionale ekonomieë te bepaal. Gedurende die tydperk rondom 1940 het die ontwikkeling van die teorie en praktyk van nasionale rekening momentum gekry. Onder toesig van die United Nations (UN) en die Organisation for Economic Co-operation and Development (OECD) is nasionale rekeninge verder ontwikkel. Die hoogtepunt van hierdie pogings was die publisering van die 1953 Stelsel van Nasionale Rekeninge. Hierdie publikasie is opgevolg met publikasies in 1968 en 1993. Die 1993 publikasie is die hersiene weergawe van die internasionale Stelsel van Nasionale Rekeninge. 'n Grootheid van die Stelsel van Nasionale Rekeninge soos die bruto binnelandse produk (BBP) word onder meer gebruik vir ekonomiese beplanning en -besluitneming.

Alhoewel belangrik, is dit noodsaaklik om 'n oorsig te kry rakende kwartaallikse BBP ramings. Daarom is die doel van die studie om te verwys na sekere tekortkominge en eienskappe van kwartaallikse BBP ramings.

Die navorsingsmetode van hierdie studie was 'n literatuur studie. Publikasies rakende die nasionale rekening gebied is skaars en meer beperk wanneer die klem verskuif na kwartaallikse nasionale rekeninge. Oor die algemeen is die bronne wat gebruik is in hierdie studie van internasionale instansies wat gemoeid is met nasionale rekeninge (teorie en praktyk). Hierdie bronne is geskoei op die primêre bron nl. die *1993 System of National Accounts*.

Nieteenstaande dat kwartaallikse BBP ramings vele toepassings en gebruike het soos onder meer die ekonomiese groeikoers, vroeë aanwyser van draaipunte in die ekonomie asook sakesiklus ontledings, is daar tekortkominge in die ramings. Hierdie tekortkominge verwys onder andere die betroubaarheid van die ramings asook dat kwartaallikse BBP ramings nie 'n maatstaf is vir welvaart nie.

Kwartaallikse BBP ramimgs is ten spyte van hierdie tekortkominge van primêre belang vir ekonomies beplanning en besluitneming.

Chapter 1

Introduction

1.1 Background to national accounts

The history of national accounting can be traced back to the seventeenth century when Sir William Pitty, in 1665, and later Gregory King, in 1688, tried to estimate the national income of England because of their interest in raising revenue and assessing England's war potential. Another attempt to describe the functioning of the economic system was made in the second half of the 18th century by Francois Quesnay who tried to describe the flow of goods in the economic system with his "Tableau Economique" (1764). Shortly hereafter Adam Smith wrote his well-known "Wealth of Nations " (1776). This was an attempt to give a theoretical explanation of the functioning of the economic system. The "invisible hand" idea regulates the flow of goods and services of the economic system through the use of the price mechanism to the advantage of all. The government does not intervene in the economy.

In the 20th century economic problems like the Great Depression in the twenties in the world economy resulted in economic problems which could not been solved by the classical theories. This problem and other market failures due to market power and non-existence of markets resulted in growing intervention by the Government in the economy. These aspects, together with the two world wars emphasise the role of Government in the economy. Therefore, economic planning became important using information about different components of the national product and spending in the economy.

The most important contribution to the rapid development of the macro economic approach is the "the General Theory of Employment Interest and Money" published by the well-known economist John Maynard Keynes in 1936. The essence of this publication was that the market mechanism does not always lead to full employment, therefore, the government has to play a role in achieving this

goal. According to Shapiro: "Not only did the event of the Keynesian theory speed the development of national income accounting, but it also influenced the form of that development." (Shapiro, 1982:19).

The development of the theory and practice of national accounts gained momentum during the 1940's due to the war-time need for mobilisation of the economy. After the war, national accounts were further developed under the auspices of the United Nations (UN) and the Organisation for Economic Co-operation and Development (OECD) culminating in the publication of the 1953 System of National Accounts (SNA), later followed by the 1968 SNA. A key person in the development of these systems was Richard Stone, who was awarded the Nobel Price in economics in 1984 for his contribution to national accounting.

Over the last decade, several international institutions and individuals have made a concerted effort to update, clarify and simplify the 1968 SNA and to harmonised it with other international statistical standards. In 1993 the revised edition of the international *System of National Accounts 1993* was published. This comprehensive document spread over 760 pages. National accounts, as described in the 1993 SNA, aim to provide a comprehensive, coherent and consistent picture of the economy or economic activity. Therefore, all transactions have to be reflected that have taken place in a certain time period between agents, that together constitute an economy. Even for a small economy this means bringing together a myriad of transactions happening during any length of time.

National accounts have a long tradition, and presently are in general recognised as one of the most important statistical systems for the development and monitoring of financial and economic programs or policies. The aggregates of the system are used in this. Some of the aggregates are gross domestic product (GDP), gross national income, gross national disposable income and national worth. An aggregate, such as gross domestic product, has become an everyday life indicator of the economic performance of a country. Even though it may be the single most important figure generated by the system, the information contained in the national accounts is far richer and more valuable than this single indicator. (IMF institute, Macroeconomic Theory and Policy, and the National Accounts, 1997:1).

Short term national accounts originated mainly as a result of the need for monitoring the economy and the analyses of short-term movements of the economy. The importance of short term national accounts derives essentially from the consideration that it is the only coherent set of indicators, available with a short time-lag, able to provide a short term overall picture of economic activity (ESA95,1996:249). Too much emphasis can be placed on quarterly national accounts without keeping in mind the nature of the data used to compile these national accounts statistics.

The frequency of short term national accounts data differs from country to country and can be monthly, quarterly or half-yearly. Important to note is that the comprehensiveness is usually inversely correlated with the frequency. In practice the shorter the period, the lesser comprehensive the data. For example, on a monthly basis only limited data are available, e.g. indicators which could be used for estimating value added of manufacturing industry such as the monthly manufacturing production indexes.

1.2 Problem statement and motivation

It is noticeable from articles published in various mediums and the variety of enquiries received at the office responsible for the compilation of the gross domestic product estimates, how much emphasis is placed on short term national accounts estimates. From time to time it seems that the authors of these articles and enquiries react as though the quarterly gross domestic product estimates were compiled from optimum data in an ideal environment. The reality is that these estimates are compiled with the best available resources, with their shortcomings and limitations.

The reason why quarterly gross domestic product estimates are compiled is mainly because of the need for monitoring and analysis of the short-term movements of the economy. "The importance of short term national accounts derives essentially from the consideration that it is the only coherent set of indicators, available with a short time-lag, able to provide a short term overall picture of economic activity." (ESA95,1996:249). Too much emphasis can be

placed on quarterly national accounts without keeping in mind the nature of the data used to compile these national accounts statistics.

1.3 Aim of the study

Although important, it is also necessary to get an overview of quarterly gross domestic product estimates. The aim of the study is therefore to refer to some shortcomings and characteristics of quarterly gross domestic product estimates.

1.4 Research methodology

The research methodology for the study will be a literary investigation. Published materials on the field of national accounts are limited and even more restricted when the emphasis is moved to quarterly national accounts. In general the sources used for the study are from international agencies dealing with the compilation of national accounts. These sources are based on the primary source namely, the SNA93, which forms the base for national accounts estimates in general.

In chapter two the 1993 System of National Accounts is discussed. In chapter three quarterly national accounts is discussed and in chapter four quarterly gross domestic product estimates. Some shortcomings and characteristics of gross domestic product estimates are indicated in chapter five, where after the conclusion follows in chapter six.

1.5 Glossary

Annualised percentage change	The annualised percentage change is the growth rate of a given quarter compared with the previous quarter, compounded to an annual rate.

Balancing items A balancing item is an accounting construct obtained by subtracting the total value of the entries on one side of an account from the total value of the entries on the other side. Balancing items are not simply devices introduced to ensure that accounts balance. They encapsulate a great deal of information and include some of the most important entries in the accounts, for example value added and operating surplus.

Basic prices The basic price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output *minus* any tax payable *plus* any subsidy receivable on that unit as a consequence of its production or sale. Basic prices exclude any transport charges invoiced separately by the producer. Basic prices is the preferred method of valuing output.

Benchmark years Benchmark years refer to those years in respect of which authoritative and detailed data are available.

Compensation of employees Compensation of employees is defined as the total remuneration, in cash or in kind, payable by an employer to an employee in return for work done by the latter during the accounting period. It is recorded on a gross basis, before any deduction for income taxes, pensions, unemployment insurance and other social insurance schemes. It also includes other forms of compensation, namely commissions, tips, bonuses, directors' fees and allowances such as these for holidays and sick leave, as well as military pay and allowances. It excludes employers' social contributions.

Constant prices Constant prices is a valuation concept expressed at the prices prevailing during a fixed reference period or base period. Currently, the base period for national accounts estimates at constant prices is 1995, which means that they have been restated at 1995 prices.

Current prices A valuation at current prices is expressed at the prices prevailing during the period being referred to.

Factor cost Factor cost is a valuation reflecting the cost of the factors of production (labour and capital). It corresponds to the value remaining after all applicable taxes and subsidies have been deducted from market prices.

GDP at market prices GDP at market prices equals total gross value added by all industries at basic prices *plus* taxes on products *minus* subsidies on products.

Generation of income account The generation of income account provides for the distribution of primary incomes to the various institutional sectors. Primary incomes are incomes that accrue to institutional sectors and industries as a consequence of their involvement in processes of production or ownership of assets that may be needed for purposes of production.

Goods and Services account The Goods and Services account shows the total resources (output and imports) and uses of goods and services (intermediate consumption, final consumption, gross capital formation and exports). Taxes on products (less subsidies) are also included on the resource side of the accounts.

Gross operating surplus/mixed income Gross operating surplus or mixed income is the balancing item in the generation on income account, i.e. the value added *minus* compensation of employees payable *minus* taxes on production payable *plus* subsidies receivable.

Gross value added at basic prices	Gross value added at basic prices is defined as output valued at basis prices less intermediate consumption valued at purchasers' prices.
Illegal production	Illegal production is the prodcution of goods and services whose sale, distribution or possession is forbidden by law, and production activities which are usually legal but which become illegal when carried out by unauthorised producers.
Industries	Industries are defined in the SNA in the same way as in the Standard Industrial Classification (SIC). An industry consists of a group of establishments engaged in the same or similar kinds of activity.
Intermediate consumption	Intermediate consumption consists of the value of the goods and services consumed as inputs by a process of production, excluding fixed assets. Consumption of fixed assets is recorded as consumption of fixed capital.
Operating surplus or mixed income	Operating surplus or mixed income is the balancing item in the generation of income account i.e. the value added *minus* compensation of employees payable *minus* taxes on production payable *plus* subsidies receivable.
Other taxes on production	Other taxes on production consist of taxes on the ownership of land, buildings or other assets used in production or on labour employed, etc. Important examples of other taxes on production are taxes on payroll or work force, stamp duties, business or professional licenses, etc.
Output	Output is defined in the context of a production account. Production accounts are compiled for establishments or enterprises, and not for processes of production. Therefore, output consists only of those goods or services that are produced within an establishment that become available for use outside that establishment.

Percentage change

When using annual data, the percentage change is the growth rate from one year to the next year. For quarterly data, the percentage change is the growth rate of a given quarter compared with the same quarter in the previous year.

Primary industries

The primary industries include the agriculture, forestry and fishing, mining and quarrying industries.

Production boundary

The general production boundary is defined as an economic activity (or production) carried out under the control and responsibility of an institutional unit that uses inputs of labour, capital, and goods and services to produce output of goods and services. The production boundary in the 1993 SNA is more restricted than the general production boundary due to the production accounts not being compiled for household activities that produce domestic or personal services for own final consumption within the same household, except for services produced by paid domestic staff.

Production account for the total economy

The production account is the first in the sequence of accounts compiled for institutional sectors, industries and the total economy. The production account contains three items apart from the balancing item namely output, intermediate consumption and taxes less subsidies on products. The output is recorded under resources on the right-hand side of the account. Intermediate consumption and taxes less subsidies on products is recorded under uses on the left-hand side of the account.

Revision of estimates	Revision of the estimates for all components of the national accounts are usually done every five years in conjunction with the rebasing of the estimates at constant prices apart from the revision of estimates for the latest quarters. At such a time the results of censuses that have become available in the meantime and any other additional information sources are incorporated in the estimates.
Seasonal adjustment	Seasonal adjustment does by means of analytical techniques, identify and remove the regular within-a-year pattern to highlight the underlying trends and short term movements in the series.
Secondary industries	The secondary industries include the manufacturing, electricity, water and construction industries.
Subsidies	Subsidies are transfers from the government to the business sector toward current cost of production. These transfers represent additions to the income of producers from current production.
System of National Accounts	System of National Accounts (SNA), refers to an internationally-agreed standard system for macro-economic accounts. The latest version is described in the System of National Accounts 1993.
Taxes on production and imports	Taxes on production and imports are taxes which add to the cost of production which and are likely to be reflected in market prices paid by the purchaser, such as sales and excise taxes, import duties and property taxes. Taxes on production and imports include taxes on products and other taxes on production.

Taxes on products

Taxes on products consist of taxes payable on goods and services when they are produced, delivered, sold or otherwise disposed of by their producers. Furthermore, they are payable per unit of a good or service produced. Important examples of taxes on products are excise and import duties and value added tax (VAT).

Tertiary industries

Tertiary industries include wholesale-, retail- and motor trade; catering and accommodation, transport and communication, finance, real estate and business services, community, social and personal services, general government services, and other producers.

Value added by industry

Value added measures the value created by production and may be calculated either before or after deducting the consumption of fixed capital on the fixed assets used. Gross value added is defined as the value of output less the value of intermediate consumption. Value added is the balancing item in the production account for an institutional unit or sector, or establishment or industry.

Value added components

The three components of value added are compensation of employees, other taxes less subsidies on production and gross operating surplus/mixes income.

Chapter 2

The 1993 System of National Accounts (1993 SNA)

2.1 Introduction

The system of national accounts is a conceptually consistent and statistically integrated database of economic statistics, organised within the framework of a comprehensive accounting system. The United Nations, in co-operation with four other international organisations, published a revised version of the System of National Accounts in 1993. This publication contains a comprehensive set of concepts, definitions and classifications for compiling national accounts. The 1993 SNA contains the theoretical framework of the 1968 SNA, thus the 1993 SNA is not a radically new system. Changes consist mainly of clarifications and adjustments of concepts and definitions, as well as an enlargement of the scope of the system. Furthermore, the 1993 SNA has been harmonised with other related statistical systems, e.g. the Balance of Payments Manual (fifth edition) compiled by the International Monetary Fund (IMF).

A short overview on the characteristics and contents of the 1993 SNA, as well as a brief look at the accounts (the method of presenting national accounts) and boundaries – as discussed in the 1993 SNA, will follow.

2.2 Characteristics of the 1993 SNA

The following are some of the characteristics of the 1993 system of national accounts:

- The 1993 SNA is designed to provide a comprehensive description of an economy.
- The 1993 SNA is flexible in as much as different countries can implement and apply the system to suit their specific circumstance and needs.

- The 1993 SNA provides guidance for national accounts almost universally - countries with different structures and at any stage of development.
- The 1993 SNA reinforces the central role of national accounts in statistics.
- The two cornerstones on which the SNA is constructed are *economic theory* and *business accounting techniques*. Basic concepts used in the SNA e.g. production, consumption and accumulation are firmly rooted in economic theory. The accounting technique is the double-entry bookkeeping principle, whereby one transaction results in two matching entries – one credit and one debit.

- The SNA can be used for :

  (i) Monitoring the behaviour of the economy
  (ii) Economic analysis and research
  (iii) Economic policy making and decision taking
  (iv) International comparisons

- An important, although a different kind of use of the SNA is that it serves as a framework for co-ordination of economic statistics by providing comprehensive and consistent concepts, definitions and classifications.

2.3 The contents of the 1993 SNA

The contents of the 1993 SNA can briefly be summarised under five main groups with sub-groups. Grouping the various chapters of the 1993 SNA forms these groups and can be seen in table1.

Table 1 – Contents of the 1993 SNA

Group	Description of the group	Sub-group	Chapters in the 1993 SNA
I	Information regarding the 1993 SNA.	Main features of the sequence in the SNA. Overview of the central framework of the SNA	1 and 2
II	Deals with the "tools" with which national accountants work to construct a system of national accounts	Defines the nature of the entries in the SNA and explains the rules of accounting which underlie those entries. Institutional units and the five institutional sectors. Describes establishments and industries.	3 to 5
III	Is built around the accounts and tables of the central framework.	Current and accumulation accounts; the balance sheets; the rest of the world account of the full sequence of accounts. The supply and use tables and input-output tables.	6 to 15
IV	Measures associated with stocks and flows which are entered into the accounts and tables.	Measures associated with stocks and flows which are entered into the account and tables. Interdependent measures which enables inflation and economic growth analyses. Population and employment statistics needed for, inter alia, per capita and productivity analyses.	16 to 17
V	Deals with elaboration applications and use of complementary or alternative concepts.	Classification of certain transactions. The flexibility of the SNA.	18 to 21

Source: SNA,1993:xlvii

2.4 Some aspects of the 1993 SNA

Some of the aspects of the 1993 SNA e.g. the accounts and the boundaries will be discussed in the next sections.

2.4.1 The accounts

The economy of a country is presented through a system of national accounts. The national accounts are often presented in the format of accounts - an arrangement of figures in a T-format – with entries on both sides (left and right). The system can depict the economic activities of the so-called agents (units) that participate in the economy, by recording all stocks and flows in the accounts. Three sets or groupings of accounts are identified and can be referred to as the central framework of the SNA. The three sets or groupings are:

- Integrated economic accounts
- Supply and use tables and
- The flow of funds accounts.

For this study, there will briefly be looked at or touched on the integrated economic accounts.

The integrated economic accounts contain three groups of accounts:

- Transaction accounts with the goods and services account.
- A full sequence of accounts for institutional sectors and the total economy, and
- A full sequence of accounts for the rest of the world (refer to table 3).

2.4.1.1 Terminology in the accounts

The table 2 indicates the terminology used in business accounting as against what are used in national accounting. The current and accumulation accounts as well as the balance sheets (columns 2 – 4), refer to national accounting.

Table 2 - Terminology in the accounts

Business accounts	Current accounts	Accumulation accounts	Balance sheets
Credit	Resources	Changes in liabilities and net worth	Liabilities and net worth
Debit	Uses	Changes in assets	Assets

Source: South African Development Community: System of National Accounts 1993 – Training Manual. Johannesburg, 1999.

2.4.1.2 Entries in the accounts

Most entries in the accounts reflect variables (transactions and stocks) which can be directly observed. Transactions reflect the values that are generated by economic actions. Most of the transactions represent an expenditure for one party and an income for another. Entries regarding stocks refer to assets and liabilities. Stocks are the stores of wealth that result from economic actions.

Transactions are always recorded twice in the system, on the use (providing) side and on the resource (recipient) side.

2.4.1.3 The format of the accounts

On the left hand side of the accounts transactions are recorded concerning transactions that constitute a use of resources or stocks that constitute an asset. On the right hand side of the accounts entries concerning transactions that constitute a resource and stocks that constitute a liability, are recorded. Furthermore, a balance or balancing item is derived between the two sides of the account, which is always recorded on the left hand side of the current accounts and the capital account. The balancing item for the financial account, the other changes in assets account as well as the balance sheets is recorded on the right hand side. These balancing items are recorded on these sides, irrespective of being negative or positive. The current accounts and the capital account show an opening balance on the right hand side, which was derived from another account (on the left hand side).

2.4.1.4 Balancing items

The creation of new so-called balancing items by the 1993 SNA introduced a significant extension to the accounting structure of the 1968 SNA. Balancing items are more than just a method to ensure that the accounts balance. Well known balancing items include value added, gross domestic product (GDP) and national income. Furthermore, balancing items cannot directly be observed and are calculated as residuals of the respective accounts.

2.4.1.5 The groupings of the accounts

The integrated accounts consist of four main groups of accounts namely, transaction account, current accounts, accumulation accounts and balance sheets.
A transaction account brings together all transactions of the same type in a dummy account. The goods and services account is of particular importance. It shows the sources of goods and services (production and imports) and the uses (intermediate and final consumption, investment in fixed capital and inventories, and exports). The goods and services account may be seen as a combined supply and use table which is aggregated over all commodities and industries.

The current accounts deal firstly with production and secondly with generation, distribution and use of income. These are current transactions that have an effect on the amount of economic value at the disposal of a unit, a sector or the total economy. Saving is the difference between all current resources (increases) and uses (decreases). Saving represents the changes in net worth resulting from current transactions.

The accumulation accounts show all the transactions and other changes in assets, liabilities and net worth. This is the equivalent of all changes between two balance sheets. Saving is the link to the current accounts, but there are also changes in net worth, other than those resulting from current accounts.

The balance sheets contain stocks of assets and liabilities and net worth at the beginning and end of the accounting period. The changes between the opening and closing balance sheet can be derived from the accumulation accounts.

Table 3 contains a list of the integrated economic accounts together with the balancing item of each account. Furthermore, some of the main aggregates are indicated. The table serves as a summary of the above text.

Table 3 - List of integrated economic accounts – with some of the main aggregates.

Number	Name of the account	Balancing item	Main aggregate
	Transaction accounts		
0	Goods and services account		
	Full sequence of accounts for institutional sectors		
	Current accounts		
I	Production account	Value added	Gross domestic product (GDP)
II.1.1	Generation of income account	Operating surplus / mixed income	
II.1.2	Allocation of primary income account	Balance of primary income	Gross national income (GNI)
II.2	Secondary distribution of income account	Disposable income	Gross national disposable income
II.3	Redistribution of income in kind account	Adjusted disposable income	
II.4.1	Use of disposable income account	Saving	
II.4.2	Use of adjusted disposable income account	Saving	Gross national saving
	Accumulation accounts		
III.1	Capital account	Net lending / net borrowing	
III.2	Financial account	Net lending / net borrowing	
III.3	Other changes in assets account	Other changes in net worth	
	Balance sheets		
IV.1	Opening balance sheet	Net worth	National worth
IV.2	Changes in balance sheet	Total changes in net worth	Changes in national worth
IV.3	Closing balance sheet	Net worth	National worth
	Rest of the world accounts		
	Current accounts		
V.I	External account of goods and services	External balance of goods and services	
V.II	External account of primary income and current transfers	Current external balance	
	Accumulation accounts		
V.III.1	External capital account	Net lending / net borrowing of the nation	
V.III.2	External financial account	Net lending / net borrowing of the nation	
Number	**Name of the account**	**Balancing item**	
V.III.3	External account for other changes in assets account		
	Balance sheets		
V.IV.3	External opening balance sheet	Net external financial position of the nation	
IV.2	External changes in balance sheet		
V.IV.3	External Closing balance sheet	Net external financial position of the nation	

Source: South African Development Community: System of National Accounts 1993 – Training Manual. Johannesburg, 1999.

SARB: Supplement to the South African Reserve Bank - Quarterly Bulletin, June 1999

The layout (in T-format) of the first three accounts indicated in table 3 will briefly be shown hereafter. With this presentation the different variables on the resources and on the uses sides of these selected accounts can be observed. Printed in *Italics* is the balancing item of each account.

Table 4 - Goods and services account

Resources	Uses
Output	**Intermediate consumption**
Taxes on products	**Final consumption expenditure**
Subsidies on products	Private consumption expenditure
Imports of goods and services	Government consumption expenditure
	Gross capital formation
	Gross fixed capital formation
	Changes in inventories
	Exports of goods and services
	Residual item
Total resources	**Total uses**

Sources: Stats SA: Statistical Report No. 04-04-01 (1993) Final supply and use tables, 1993, Pretoria 1999

Table 5 - Production account

Uses	Resources
Intermediate consumption	Output
	Taxes on products
	Subsidies on products
Gross domestic product	

Sources: Stats SA: Statistical Report No. 04-04-01 (1993) Final supply and use tables, 1993, Pretoria 1999

Table 6 - Generation of income account

Uses	Resources
Compensation of employees	Gross domestic product
Taxes on production and imports	
Taxes on products	
Other taxes on production	
Subsidies	
Subsidies on products	
Other subsidies on production	
Gross operating surplus/mixed income	

Sources: Stats SA: Statistical Report No. 04-04-01 (1993) Final supply and use tables, 1993, Pretoria 1999

2.4.2 Boundaries

National accounts aim to provide a picture of the economy, therefore, only transactions and stocks that have an economic meaning should be included. Transactions are not easily classified as economic or not-economic. Furthermore, many assets can be assigned with an economic meaning depending on the point of view taken to judge or evaluate them. Examples of such borderline cases are the transactions where unpaid household work is involved and fishing grounds (asset). In order to deal more easily with these difficulties, boundaries are needed to delineate exactly what should be included and what should be excluded into the national accounts. Some of these boundaries are shortly discussed in the next three paragraphs.

2.4.2.1 The production boundary

One of the most important national accounts rules concerning the content of transactions, is the production boundary. This rule does not only determines what production is and what is not production, but indirectly also help to determine what is regarded as income, consumption, investment etc. Per definition the production boundary rules that all goods are to be included whether produced for own consumption or not. Services are to be included when they are sold on the market or produced by paid labour e.g. civil servants and domestic workers. In principle, producing services for own consumption is not regarded as production. The production of owner-occupied housing services is an exception, and is therefore included.

2.4.2.2 Legal and illegal production

National accounts are not concerned with the question of whether production is legal or illegal. Illegal production is the production of goods or services whose sale, distribution or possession is forbidden by law, as well as production activities which are usually legal but which become illegal when carried out by unauthorised producers. This implies, for practical purposes, the inclusion of illegal transactions such as production and trade of drugs. These transactions are

illegal in many countries. A reason for including these illegal production is that what is illegal in one country or at a certain time may be legal in another country or in a different period. The exclusion of these transactions would distort the picture of some economies. An example, the disregarding of consumption of drugs at a time and in a country where this consumption is prohibited but common practice, this would not only distort the figures on consumption but also on value added, income and saving. Furthermore, important to be noted that not all-illegal activities are to be included. Illegal activities such as abduction and blackmail, which can have economic effects, are excluded, for the reason that the transactions are not based on mutual consent.

2.4.2.3 The asset boundary

For flows and stocks to be recorded in the accumulation accounts and balance sheets, the asset boundary is an important rule to adhere to. Basically an asset should be economic and an economic asset should meet two criteria. Firstly, an economic asset must be owned by an individual or collectively e.g. local government. Secondly, it is necessary that its owners may derive economic benefits from the asset over some length of time, by using it or holding it.

2.5 Annual, quarterly and regional national accounts

References up to this point in the study refer – unless otherwise specified - to annual national accounts. Annual national accounts give a comprehensive overview of a country's economic situation, on an annual level. From time to time the need for short term analyses appears. This need led to short term national accounts. Short term national accounts can be compiled, quarterly and half-yearly. Regional national accounts can also be compiled. Regional national accounts are defined as a system of accounts at a regional level. It implies treating each region as a different economic entity. Regional accounts are of special importance when there are gaps between the economic and social development of the various regions of a country (SNA,1993:440). The greater or bigger the contrast between the regions the more useful is such a system. In the South Africa circumstances, a region can be defined at e.g. a provincial, a district level and a statistical region.

2.6 Conclusion

The System of national accounts is a conceptually consistent and statistically integrated database of economic statistics, organised within the framework of a comprehensive accounting system. The system of national accounts can be used for, inter alia, monitoring the economy as well as for economic policy making and decision taking. The 1993 SNA is a 760 pages document. The contents of the 1993 SNA can be summarised into five main groupings. A brief overview of the accounts were given i.e. the format of the accounts, the terminology used in the accounts, the balancing item of each account and finally some of the main aggregates were indicated. Apart from the list of integrated accounts and their balancing items, some of the main aggregates were also indicated. Furthermore, the layout of the Goods and Services account, the Production account and the Generation of income account were shown in a T-format. The production -, legal and illegal - and the asset boundaries which are all boundaries applied in the national accounts were discussed. Furthermore, the annual, quarterly and regional accounts were respectively defined. This study will concentrate on the quarterly national accounts aspects onwards.

Chapter 3

Quarterly National Accounts

3.1 Introduction

How is quarterly national accounts defined? Two extreme answers can be given. One, that quarterly national accounts comprise a full sequence of national accounts on a quarterly basis. Two, quarterly national accounts comprise quarterly gross domestic product (GDP) estimates. Thus, country practices differ. Some countries compiles only GDP estimates, whilst other countries compile a mature or more developed set of national accounts (a full set of national accounts i.e. the current accounts and capital and financial accounts). Furthermore, a mature set of quarterly national account could also be " ...a set that would meet the most user requirements, while meeting timeliness criteria." (IMF Institute, Quarterly National Accounts: Scope and Role, 1997:4)

A mature set or a full sequence of quarterly national accounts can include current and constant price estimates. These estimates can consist of total gross domestic product (GDP), value added of the different industries, data on the different expenditure items e.g. household consumption, government consumption, changes in inventories, fixed capital formation, imports and exports. In this chapter the purpose of quarterly national accounts will firstly be discussed. Then the set of national accounts compiled by South Africa will follows. Finally, the compilation of quarterly national accounts will be discussed.

3.2 Purposes of quarterly national accounts

Quarterly national accounts share most of the purposes of annual national accounts, but with a different emphasis.

In order to compare the different purposes, those of the annual national accounts will firstly be mentioned:

- The most common purpose of national accounts is as macro-economic indicators. The most important macro-economic aggregates used as indicators are, inter alia, GDP and national income (NI).
- GDP and NI serve as a yardstick for the strength of the economy as they are concerned about the development over time.
- The level of GDP and NI is also often used as a denominator for fiscal, financial and monetary variables.
- At a more detailed level annual national accounts serve as basic data for analysis and forecasting.
- Annual national accounts serve as basic data for market research in particular commodity breakdowns of household consumption are used to determine a company's market share.

Most of these purposes apply also for quarterly national accounts, but as a result of the lesser detail, quarterly national accounts are not the most suitable for thorough analysis. Despite this, quarterly national accounts do have other purposes, namely: quarterly national accounts

- serve as a framework for business cycle analysis,
- is an early indicator of economic development and
- serve as early estimate of annual national accounts

Some of these purposes can be seen as characteristics of quarterly gross domestic product estimates, and will therefore be discussed in paragraph 5.2.3 (Purposes of quarterly national accounts).

These specific purposes of quarterly national accounts should not let users concluded that annual national accounts could be replaced by quarterly national accounts. A trade off exists between the quarterly and annual national accounts. This trade off is in respect of timeliness and quality. International best practices indicate a timeliness of three months for quarterly national accounts, thus the quality is effected by the timeliness compared to annual national accounts and the reverse applies for annual national accounts compared with quarterly national accounts. (IMF institute: Quarterly National Accounts: Scope and Role, 1997:4)

Therefore, it is important that quarterly national accounts are firmly linked to a well developed and reliable system of annual national accounts.

3.3 A set of South Africa's quarterly national accounts

In South Africa the compilation of quarterly national accounts is a shared responsibility, between Statistics South Africa (Stats SA) and the South African Reserve Bank (SARB). Stats SA compiles and publishes the quarterly gross domestic product estimates using the production approach. The SARB on the other hand compiles and publishes quarterly gross domestic product estimates using the expenditure approach. The quarterly gross domestic product estimate compiled by Stats SA is the official gross domestic product estimate. Stats SA's figures are published in the quarterly Statistical Release P0441 – Gross Domestic Product. The SARB statistics are published in the SARB quarterly Bulletin.

The following table contains a list of national accounts tables quarterly published by South Africa.

Table 7 - Quarterly national accounts tables published by South Africa

- Gross domestic product by industry - at current and constant prices.
- Expenditure on gross domestic product - at current and constant prices.
- Final consumption expenditure by households - at current and constant prices.
- Final consumption expenditure by households according to purpose - at current and constant prices.
- Gross fixed capital formation.
- Gross fixed capital formation by type of asset.
- National income and saving (selected items).
- Current income and expenditure of general government (selected items).
- Current income and expenditure of households (selected items).

Source: SARB: Supplement to the South African Reserve Bank - Quarterly Bulletin, June 1999 and Stats SA: Statistical Release P0441 Gross Domestic Product – Revised estimates 1993 – 1998, First quarter 1999, 22 June 1999.

3.4 Compilation of quarterly national accounts

The compilation of quarterly national accounts and the estimation of the aggregates are based on a multitude of sources. These sources are usually referred to as basic statistics. As a result of the nature of national accounts – a comprehensive overview of the economy – almost all available economic statistics as well as selective social and demographic statistics are used in the compilation of national accounts statistics. A so-called correct answer to the sources used doesn't exist as the choice depends on national circumstances of a country. A wide range of different sources and methods are used in the statistically leading countries. The principle is that sources and methods decided on and used, must be the most represented available for the particular component that is being measured or estimate.

A country which gives consideration to the development of a system of quarterly national accounts usually has an established system of annual national accounts, including a set of sources and methods. Furthermore, a country which wants to develop quarterly national accounts does have a sophisticated statistical system that includes monthly and quarterly data which could be used as indicators. A newly designed and developed system of quarterly national accounts is restricted to the current available monthly and quarterly indicators.

Three approaches or methods (describe in paragraph 4.2 – Compilation methods for GDP estimates) exist to calculate or compile gross domestic product (GDP) estimates. Some of the same available data is used in the different approaches, e.g. the same government financial data can be used to compile variables for all the different approaches. Equally, data sources used for construction activity can be used for the construction industry (production approach) as well as for gross fixed capital formation (expenditure approach). The conclusion is that even when different approaches are used for compilation, the different approaches are not fully independent.

While it is to a large extent clear that there are more than one so-called correct way of going about in the compilation of national accounts, there are on the other

end some last resort or incorrect methods. The least satisfactory methods are techniques that do not have a strong data foundation or base, e.g. mathematical techniques that will generate estimates even in the absence of data. Extrapolation of the previous trends or trends of a related component is an example of these before-mentioned techniques. Nevertheless, all countries do have some gaps in their statistics that need to be filled by less satisfactory methods. In a well developed system of quarterly national accounts, these gaps are confined to components for which it is difficult to collect data (e.g. subsistence farming and some of the tertiary industries) and which are a small proportion of the total (e.g. the informal sector).

The decision to adopt a specific approach and method for the compilation of quarterly national accounts is not made only on the quality of basic statistics and user needs, but also to a large extent on the available statistics. Changes to existing collections or new collections may be introduced to fill gaps or shortcomings in the source data, in order to compile even more reliable quarterly national accounts. The system of quarterly national accounts is used as a tool in influencing statistical developments as quarterly national accounts themselves are used to identify shortcomings and gaps in the base of statistical indicators. This practice is evident in Stats SA's, South Africa's statistical agency, re-engineering process of economic statistics. Economic censuses and surveys, especially if redesigned in the past five years, clearly state in the top half of the front page of these censuses and surveys questionnaires: "Purpose of the survey". To generalised it, the following is stated underneath the purpose of the survey " ... survey is an annual survey covering the activities of a sample of private and public businesses/organisations operating in most of the industries of the South African economy. Results of the survey are used to compile estimates of the Gross Domestic Product and its components, which are used, in turn, to monitor and develop government policy..... " (Stats SA - Economic Activity Survey, 1999:1).

3.4.1 Developing sources and methods for the compilation of quarterly national accounts

As already mentioned, each country has to develop its own sources and methods in compiling national accounts in general and quarterly national accounts in particular, as there are no standard answers or recipes to follow. The objective is to use the method which results in the best available measurement of a variable or an item, within the limitations of given or existing data sources. Countries' circumstances and the way its statistical system is developed play a major role in the decision of adopting a method for compilation. It should be mentioned that even among the highly regarded quarterly national accounts compilers, there are no universally adopted methods (IMF institute, Quarterly National Accounts: Sources and Methods,1997:2).

When a country is in the process of developing quarterly national accounts methods, a possible but highly recommended method is to use the same method which is used for the annual national accounts estimates. The reason therefore is that if the same source data is available quarterly, the problem of inconsistency will be avoided. Furthermore, it will reduce the complexity of the processing system, which should also be kept in mind, especially when dealing with restricted resources.

More often, data used in a specific method to compile annual national accounts estimates, are not quarterly available or available in less detail. For each of these cases, the current available data sources should be assembled. Data sources need to be assessed taking the following factors into account:

- Definitions (coverage, units, classifications)
- Timeliness (availability within a short period) and time-series availability
- Accuracy in indicating annual movements and
- Revisions in the quarterly indicator.

However, in many cases there will be little, if any, choice about the data sources to be used as indicators for the compilation of national accounts. Given this, it is still necessary to assess the indicator for purposes of accuracy and reliability. The

quality of the indicator should be discussed with the survey areas. Usually, survey statisticians will be in a position to give background information that will help with the interpretation of these statistics. The opposite situation is also true. Often, national accountants are able to identify problems that the survey areas aren't aware of. This is due to the fact the system of national accounts is a balanced system. A balanced system can be seen as a characteristic of the system of national accounts. In a much longer term, these assessments can be help identify priorities for improvement in the collection of statistics and also stressed the need to start new collections.

3.4.2 A manual regarding sources and methods for compiling quarterly national accounts

It is highly desirable that all decisions and reasons about sources and methods are well documented. This document or manual is useful for the compilers of national accounts statistics in cases of where problems arise, staff turnover and the absence of key personnel. Furthermore, users, who often wish to know more about the compilation of national accounts, can use this document or manual to get a better understanding. Both institutions (Statistics South Africa and the South African Reserve Bank) responsible for compiling South Africa's national accounts published their "Sources and Methods" in June 1999. Statistics South Africa went beyond this, "Sources and Methods" is standard in the quarterly Statistical Release P0441 - Gross domestic product (see Annexure A - Statistical sources and methods).

3.5 Conclusion

Quarterly national accounts can either be GDP estimates only, or consist of a full set of national accounts. No country has succeeded to compile quarterly balance sheets (SNA,1993:440). When taken data constraints and timeliness requirements into account, it seems unlikely for most countries to achieve a full set of the accounts on a quarterly basis. The sensibility of a set of accounts (including the balance sheets) can be questioned.

Although quarterly national accounts do have specific purposes, they can't replace the annual national accounts, as quarterly national accounts on their turn have their own specific purposes.

Methods used for the compilation of quarterly national accounts, are most likely the result of data availability rather than compilers of national accounts having made a choice between the three approaches. It is highly desirable that the sources and methods decided on are well documented for later references.

A specific feature or aspect of quarterly national accounts is quarterly gross domestic product estimates and will be discussed in the next chapter.

Chapter 4

Quarterly Gross Domestic Product estimates

4.1 Introduction

Quarterly gross domestic product estimates can be compiled by one of three different methods or approaches. The method used, or decided on, is almost directly dependent on the available basic statistics or data sources. Often countries apply more than one method in order to overcome the weaknesses of a particular method. With this strategy, all available information and data sources are combined in compilation processes to produce the most reliable quarterly GDP estimates. The different methods will be discussed in the following sections.

4.2 Compilation methods for GDP estimates

The three methods used to calculate GDP estimates are the:

- expenditure approach
- production approach and
- income approach.

The expenditure approach is the sum of all expenditure components e.g. household and government consumption, whereas the production approach estimates the GDP as the sum of value added of all industries *plus* taxes on products *less* subsidies on products. The production approach is often referred to as the output approach. The income approach estimates the GDP as the sum of compensation of employees, gross operating surplus/ mixed income *plus* taxes on production *less* subsidies on production.

In table 8 a summary of the three approaches to calculate GDP estimates are presented.

Table 8 - The three approaches to calculate GDP estimates

Production approach		Expenditure approach		Income approach	
+	Sum of values added of all industries at basic prices	+	Final consumption expenditure	+	Compensation of employees
+	Taxes on products	+	Gross fixed capital formation	+	Taxes on production and import
-	Subsidies on products	+	Changes in inventories	-	Subsidies on production
		=	Gross domestic expenditure	+	Operating surplus / mixed income
		+	Export of goods and services		
		-	Import of goods and services		
=	**Gross Domestic Product at market prices**	=	**Gross Domestic Product at market prices**	=	**Gross Domestic product at market prices**

Source: South African Development Community: System of National Accounts 1993 – Training Manual. Johannesburg, 1999.

As already mentioned (in chapter 3), the South Africa situation regarding the compilation of quarterly gross domestic product estimates, is as follows: Stats SA compiles and publishes the quarterly gross domestic product estimates by using the production approach, whilst the SARB compiles and publishes quarterly gross domestic product estimates by using the expenditure approach. The next table indicates the approaches applied by different countries to compile quarterly national accounts.

Table 9 - Scope and coverage of quarterly national accounts: OECD country practices

Country	Production approach	Expenditure approach	Income approach
Canada	X	X	X
United States		X	X
Japan		X	X
Australia	X	X	X
New Zealand	X	X	
Austria	X	X[1.]	
Denmark	X	X	X[2.]
Finland	X	X[1.]	X[2.]
France	X	X[1.]	X[2.]
Germany	X	X[1.]	X[2.]
Italy	X	X[1.]	
Netherlands	X	X[1.]	
Norway	X	X[1.]	X[2.]
Spain	X	X[1.]	
Sweden	X	X	
Switzerland	X[3.]	X[1.]	
Turkey	X	X	
United Kingdom	X	X	X

Source: IMF Institute/Statistics department: lecture note - Quarterly National Accounts: Scope and Role, December, 1997, Washington D.C.

1. Changes in inventories are mainly derived as a residual.
2. Operating surplus is mainly derived as a residual.
3. Production approach is used to estimate GDP, but with no breakdown by kind of activity or industry breakdown.

A remark regarding footnote2. If operating surplus is mainly derived as a residual, then the method applied is not the income method. It is then rather the production method. Furthermore, it is evident that all the listed countries use mostly the expenditure approach and with the exception of two countries, they also apply the production approach. These two methods are also applied in South Africa in order to compile national accounts estimates.

Some elaboration on the production approach (the method applied by Stats SA) will follow, unless otherwise specified.

4.3 Quarterly GDP by the production approach

Using the production approach to measure quarterly gross domestic product is one of the most commonly applied of the three approaches (IMF institute, Quarterly national accounts: Sources and methods,1997:1). GDP estimates calculated by the production approach are usually presented as GDP by kind of economic activity or GDP by industry. South Africa's official quarterly gross domestic product estimate is compiled by the production approach and presented as "GDP by industry" (Stats SA, P0441, 2000 : 6). In general, if a country makes use of the production approach, it can be seen as a reflection of data availability. The required basic data can readily be obtained from physical data which is often widely available, prior to the introduction of quarterly national accounts.

The production approach (presented as GDP by industry or GDP by kind of economic activity) provides a useful perspective on the industry composition of growth in a country. This is also known as the weight of an industry to the total growth or value added (refer to table 10 – The weight of each industry to the 1999 GDP in South Africa). This industry composition presentation makes it particular suitable for deriving productivity measures - in conjunction with labour statistics - by industry. Furthermore, comparisons can be drawn between the industries by comparing their performances. The income and expenditure approaches have the limitation of measuring productivity in total compared to the production approach's industry breakdown. (The classification of industries is presented in Annexure B.)

Table 10 - The weight of each industry to the 1999 GDP of South Africa

Industry	Weights 1999 (percent) 1/
Agriculture, forestry and fishing	4,2
Mining and quarrying	5,8
Manufacturing	18,2
Electricity and water	3,3
Construction	2,8
Wholesale and retail trade; hotels and restaurants	12,4
Transport and communication	9,8
Finance, real estate and business services	16,4
Community, social and personal services	2,4
General government services	13,7
Other producers	2,4
Total value added	*91,4*
Taxes less subsidies on products	8,6
GDP at market prices	100,0

Source: Stats SA: Statistical Release P0441 Gross Domestic Product, Fourth quarter 1999, 28 February 2000.

1/ The weight of each industry for the year 1999 is the share of its real value added of the GDP for the year 1998. Similarly, the weight of taxes less subsidies on products is the share of its value of the GDP for the year 1998.

Furthermore, it is highly recommended to calculate a complete set of estimates showing the variables or items in the production account (see table 5 - The production account). This should preferably be done at both current and constant prices. South Africa publishes annual production accounts at both current and constant prices. These annual production accounts are independently compiled from the quarterly GDP estimates and will be published in every November edition of the Statistical Release P0441 – Gross Domestic Product.

A typical feature of the production approach – applied on a quarterly basis – is its dependence on output data together with certain assumptions of fixed ratios. These ratios are of intermediate consumption to output and differ from industry to industry. Such ratios are given when applying the production approach on a quarterly basis. Some industry ratios will be up to 70%, while others could be close to 30%. These ratios are applied due to the lack of sufficient short term basic statistics. The lack of sufficient basic statistics is a result of the difficulty

experienced in the collection of statistics which are used to calculate value added within the short timeframe.

4.3.1 Valuation

National accounts can be valued at current and at constant prices. Apart from current and constant prices other valuation concepts also exist. Table 8 refers to "sum of value added of all industries at basic prices" and " gross domestic product at market prices". Production approach estimates lean themselves to a variety of alternative valuation basis'. Some countries still produce estimates at factor cost, although the factor cost concept has virtually been dropped in the 1993 SNA. Factor cost is a measure of income and not production. Furthermore, factor cost valuation is also unsatisfactory as it is inconsistent with the expenditure estimates which are valued at market prices. No meaningful comparisons can be made when one set of estimates is valued at e.g. factor cost and another set of estimates is valued at market prices.

A preferred way to value estimates, calculated from the production approach, is to calculate value added at basic prices for the different industries, then add the taxes less subsidies on products. This results in total GDP at market prices. This method is currently followed by Stats SA in producing GDP estimates and, therefore, is consistent with the expenditure approach of calculating GDP estimates, which is valued at market prices.

In table 11 the different valuations of market prices as described in the 1968 and 1993 SNA, can be seen.

Table 11 – GDP at market prices in the 1993 and the 1968 SNA

GDP at market prices – 1993 SNA		GDP at market prices – 1968 SNA	
+	Sum of values added of all industries at basic prices	+	Sum of value added at factor cost
+	Taxes on products	+	Taxes on products and production
-	Subsidies on products	-	Subsidies on products and production
=	**Gross Domestic Product at market prices**	=	**Gross Domestic Product at market prices**

Source: SARB: Supplement to the South African Reserve Bank - Quarterly Bulletin, June 1999

The difference lies in the treatment of the taxes and subsidies on products and on production.

4.3.2 Collection of basic statistics

An essential pre-requisite for producing reliable national accounts statistics, is an appropriate degree of reliability of the collected basic statistics. Calculations done at a more disaggregated level are recommended, as it will improve the estimates. The basic statistics used as indicators for the compilation of quarterly GDP estimates, as calculated from the production side, can broadly be split into the following categories or types namely:

- Physical quantities
- Other volume indicators
- Financial data
- Indirect indicators for example employment and hours worked
- Trend factors or extrapolation.

The above-mentioned categories will briefly be discussed, hereafter.

4.3.2.1 Physical quantities

Statistics in terms of physical quantities are often used as indicators measuring output of goods producing industries e.g. agriculture (tons of maize), mining and quarrying (tons of coal) as well as manufacturing (number of cars).

Businesses are more prepared to make data available on physical quantities produced than financial information. These physical quantities are helpful when compiling timely quarterly GDP estimates.

The usefulness of physical quantity data is limited by the homogeneity of the commodities, e.g. for basic commodities. Often, there is a relative small variation in quality and price, for example commodities like wheat and basic metals. When using physical quantity indicators for these commodities some difficulties like timing and valuation can be avoided which could appear when using financial

information instead. The trade-off between physical quantity data as to financial information isn't worth the time factor which plays a crucial role in the compilation of quarterly gross domestic product estimates.

On the other hand, items that have a considerable variation in quality and price are not, or are less, suitable for physical indicators. This applies for most manufactured goods or products such as motor vehicles, some agricultural and mining products. For commodities such as clothing and specialised equipment, quantities are poor indicators.

Most countries produce an index of mining production and/or manufacturing production. The production indexes are established before these countries consider quarterly national accounts. These indexes of production are usually collected on a monthly basis and are based on quantity and deflated sales data. Such indexes can be used directly in the quarterly national accounts if they suit the requirements of quarterly national accounts. Often some sort of adjustment is needed to incorporate the indexes into the quarterly national accounts, e.g. to apply the indexes at a more disaggregated level.

4.3.2.2 Other volume indicators

Physical quantity data are not available for some secondary and all tertiary industries, but a wide range of other volume measures are available. The table below contains examples of these other volume measures.

Table 12 - Other volume measures

Industry	Other volume indicator
Construction	Floor area built by type of building
Hotels and restaurants	Number of bed nights sold
Transport	Number of passengers and passenger per kilometer; tons of freight and ton per kilometer
Services to Transport	Number of ships handled in a port; number of aircraft and passengers handled at an airport, number of days for which cars were hired; weight or volume of goods stored
Communication	Number of mail and parcels handle, telephone calls per minute both local and international, number of telephone line rentals; number of cellular phone subscribers
Ownership of dwellings	Number by type and size of dwelling
Other business services	Number of wills, court cases, divorces for lawyers
Community and other services	Number of students; number of patients; number of ticket sold by theaters and other forms of entertainment

Source: IMF Institute/Statistics department: lecture note - Quarterly National Accounts: Sources and Methods, December, 1997, Washington D.C.

Appropriate population statistics can be used in various areas where no specific sources are available for example, subsistence farming, housing and consumer services.

The potential varieties of indicators is very wide and are often like loose ends of a rope, whereas indicators such as production indexes are part of a comprehensive and structured statistical system. This wide variety of data are sometimes collected from different departments and agencies, some are unpublished information but can be made available on request to the institution responsible for the compilation of GDP estimates.

4.3.2.3 Financial information

Annual national accounts are usually based on financial information. Lack of resources, high collection cost and the timeous availability of information makes quarterly financial information much more limited, especially in the number of items ask in a survey as well as the coverage of a survey. Quarterly financial surveys are more restricted to overall totals e.g. total sales, total turnover and total income, which are used as an indicator for output. These quarterly financial information are often collected for specific industries most likely those industries for which physical data are inadequate or just not available.

Other types of data that is classified under the financial information include value data, sales data and turnover data. Tax systems, e.g. value added tax (VAT) provide data on sales or turnover. Their advantage is their wide coverage, but a disadvantage is that classification problems can be encountered.

4.3.2.4 Indirect indicators

Thus far, direct indicators were discussed. Sometimes direct measures aren't available and other possibilities e.g. related activities, have to be identified in order to fill the gaps in the estimates. Some examples of indirect indicators are:

- The supply of building material e.g. cement can be used for construction activity.
- Employment and hours worked

Many countries make use of employment related indicators to calculate quarterly GDP estimates for the tertiary or services industries. More often, monthly or quarterly employment information is already available in many countries by means of surveys or as a result of a payroll-based tax system. These indicators can be used as volume indicators for output and value added. The assumption implied by making use of this method is that employment is directly related to output and value added. Labour is a major input to the services industries and constitutes a high portion of value added.

Problems can occur if employment does not have a fixed relationship to output. Factors such as productivity, capital intensity and profitability can influence the employment relationship to output. Number of hours worked is a better indicator of labour costs or input than numbers of employment. Changes in standard working hours, the proportions of part timers or casual workers and overtime affect output, but not necessarily the numbers employed.

4.3.2.5 Trend factors or extrapolation

As a last resort these possibilities for extrapolation factors can be used to fill the gaps. This should only be considered when no direct or indirect indicator is available. Hopefully it will be just a few items or variables. The possibilities for extrapolation factors are:

- A flat growth rate based on the past trends
- The growth rate of a closely related industry
- The growth rate of a mix of industries or
- The overall growth rate in the economy.

The technique decided on must still reflect the current trends of a specific industry as far as possible. Various options exist to try and identify a trend. Important to

note, that extrapolation on the basis of past trends is generally not the most desirable indicator.

Once again, a general rule when dealing with statistics is that indicators should be carefully considered. Indicators should be reliable and relevant.

To summarise the above discussion on indictor types and selection, the following table is a generalised summary of OECD member countries'

Table 13 - Types of basic statistics used for the compilation of quarterly GDP estimates by the production approach

Industry	Volume indicator	Financial data	Indirect: Employment/ hours worked	Indirect/other
Agriculture, Forestry, Fishing	X	X		X Trend extrapolation (small components – subsistence)
Mining and quarrying	X	X	X	
Manufacturing	X	X		
Electricity, water	X	X	X	
Construction	X	X		X Supply of building materials
Wholesale and retail trade	X	X		X Supply of goods (commodity flow)
Restaurants and hotels	X	X	X	
Transport, storage and communication	X	X		X Volume of goods transported
Financial intermediation		X	X	X Value of loans/deposits
Real estate, business services		X	X	
Ownership of dwellings	X			X Trend extrapolation
Other, community and government services	X	X	X	
Net taxes on products		X		X Constant price value of relevant products

Source: IMF Institute/Statistics department: lecture note - Quarterly National Accounts: Sources and Methods, December, 1997, Washington D.C.

4.4 Suggested "ideal" data set for compiling quarterly estimates

Most countries do have gaps in their coverage of quarterly gross domestic product estimates. Gaps are due to a lack of suitable indicators. Thus, there's always room for improvement in the compilation of quarterly gross domestic product estimates.

Most of the time the improvement is dependent on new sources or indicators. Table 14 should be regarded as an ideal, main data set, with other information which is also required in the estimation process. Included in the ideal main data set are items indicated with an asterisk. These items are likely to be included when a statistical system is to be established or developed, but involve measurement problems (services prices), register problems (foreign trade in services) and issues of budgeting or costs and the burden on businesses. To be noted: the value of any income data form tax authorities would need to be carefully considered for definitional differences and other problems of measurement.

Table 14 - Ideal data requirements for quarterly accounts[1.]

• Household budget surveys Expenditure on goods and services. The key point is the need for the sample to be balanced quarterly.
• Industry surveys[2.] Collecting information on: Sales/turnover Purchases* Gross fixed capital formation Inventories Foreign trade in services* Wages and salaries Operating surplus* Employment
• Government spending and receipts on an accrual basis.
• Foreign trade statistics
• Prices Consumer price Producer prices (including agriculture) Service prices* Export and import prices
• Tax authorities and government administrative records Information on the following variables might be available from government administrative sources and be used to compile GDP through the income method. Wages and salaries Operating surplus Mixed income

Source: OECD - Handbook on quarterly national accounts, draft version, October 1998.

1. Based on the expenditure, production and income approaches, at current and constant prices.
2. Consideration should be given to the industry breakdown.

If items marked with an asterisk are excluded from the list, the list may be regarded as a minimum requirement to provide meaningful quarterly gross domestic product estimates.

The sources and methods currently used to compile South Africa's quarterly gross domestic product estimates from the production approach are attached in Annexure A.

4.5 Conclusion

Quarterly GDP estimates can be compiled by one of three approaches, which are the expenditure, production and income approach. Countries often apply these different approaches to compile quarterly GDP estimates. Usually the approach applied is a mirror picture of the available data sources. An advantage of the production approach is its industry breakdown, and the various comparisons which could be done on such a breakdown.

Basic statistics are used to compile GDP estimates. These statistics can broadly be grouped into categories. The categories are as follow: physical quantities, other volume indicators, financial data, indirect indicators and trend factors/ extrapolation.

Most countries do have gaps in their coverage of quarterly gross domestic product estimates. Gaps are due to a lack of suitable statistics and national accounts compilers should always strive to reach the ideal data requirements.

Chapter 5

Characteristics and shortcomings of gross domestic product estimates

5.1 Introduction

GDP estimates have become an everyday life indicator of the economic performance of a country. The background of GDP estimates was discussed in the previous chapters of this study. In this chapter the emphasis will be on the characteristics and shortcomings of quarterly gross domestic product estimates. Some of the characteristics which will be discussed is the alternative presentations of quarterly GDP estimates and the purpose of quarterly national accounts. Limitations of national accounts, quarterly national accounts versus annual national accounts and annualised rates are a few of the shortcomings which will be discussed.

5.2 Characteristics of gross domestic product estimates

Some of the characteristics will be discussed in the paragraphs to follow.

5.2.1 Alternative presentations of quarterly gross domestic product estimates

Quarterly GDP estimates can be compiled at current prices and/or constant prices. Both current and constant price estimates could be presented in original (before seasonal adjusted) as well as seasonal adjusted estimates. These quarterly GDP estimates can be presented in levels, growth rates, accounts, matrixes, specific matrixes, graphs, indexes and formulas. The paragraphs to follow will touch briefly on some of these alternatives.

5.2.1.1 Levels - Original and seasonal adjusted estimates

Quarterly GDP estimates - both at current and constant prices – can be presented as original (actual) and seasonal adjusted estimates. These quarterly GDP estimates can be presented in levels and/or growth rates. When analysing the

change in the economy over time, the main concern is usually whether more goods and services are actually produced now than at some time in the past. Changes in GDP estimates at current prices show changes in monetary value of the industries' value added. These changes in monetary value can reflect changes in both price and quantity. It is difficult to establish how much of an increase is due to either increased activity in the economy, or to an increase in the prices level. As a result of this uncertainty, it is useful to compare GDP estimates at constant prices when analysing the real growth in the economy over time.

However, if quarterly gross domestic product estimates at constant prices for consecutive quarters for a number of years, are tabled and graphed, it is often difficult to identify the underlying direction or trend of the data. The most obvious pattern in the data may be the cyclical within-a-year pattern, or the so-called seasonal pattern. This is as a result of actual quarterly GDP estimates at constant prices. The way to get around the seasonal pattern is to seasonal adjust the quarterly GDP estimates.

Seasonal adjustment does by means of analytical techniques, identify and remove the regular within-a-year pattern to highlight the underlying trends and short term movements in the series. A seasonally adjusted series is defined as a series from which the regular recurring seasonal pattern has been removed. Thus, the series consists of the trend and the irregular component.

The starting point for seasonal adjustment is the basic assumption that a time series can be seen, consisting of three main components:

- The trend-cycle (T_t),
- Seasonal variations (S_t) and
- Irregular variations (I_t).

The relationship between the original series and its trend cycle, seasonal variation and irregular variation components can either be additive or multiplicative. The trend-cycle (T_t) is the underlying path or general direction reflected in the data. The seasonal variation (S_t) includes seasonal effects and other systemic effects. Seasonal effect is defined as an effect that is to a large extent stable in terms of

annual timing, direction and magnitude. This is caused by e.g. natural factors, administrative or legal issues and social or cultural traditions. Other systemic effects which have effects on the time series are e.g. the variations in the number of working or trading days in a specific period or events that occur at regular intervals but not exactly the same time each year for example moving holidays (Easter weekend).

An irregular effect (I_t) is an effect that is unpredictable in terms of timing, impact and duration. Examples are sampling errors, non-sampling errors (lack of sampling), unseasonable weather changes, natural disasters and strikes.

It is important to emphasise that seasonal adjustment and trend estimates represent an analytical massaging of the original data. Seasonal adjusted data and the estimated trend component complement the original data, but never replace it. Data before seasonal adjustment shows the actual changes that have occurred.

Country practices vary. Some countries compile and publish seasonally adjusted quarterly national accounts data, based on seasonally adjusted source data, however, most countries compile "raw" quarterly national accounts and then seasonal adjust the relevant national accounts series or components. The latter seems preferable for the following reasons:

- Seasonal adjusted data represents a *loss of information.* Before seasonal adjusted data shows what has actually happened during the relevant period. Seasonal adjustment and trend estimates are analytical massaging of data. As mentioned before, seasonal adjusted data and trend estimates at their best can only complement the original data but can never replace the original data.
- Errors in the basic data may be more easily identified or detected on the seasonally adjusted data, but it may be easier to identify and correct the source for the errors, when working with the original data.
- It seems easier to reconcile before seasonal adjusted national accounts estimates. Since, before seasonally adjusted data shows what actually has happened in a specific period, it may be easier to identify and adjust the source of the discrepancy, in the original data.

- The quality of the seasonal adjusted national account aggregates may be improved by conducting the seasonal adjustment at a more aggregated level. Aggregation often reduces the irregular component.

Seasonally adjusted estimates for balancing items can be derived through two methods, either by seasonally adjusting the balancing item directly or indirectly as the balance of seasonally adjusted estimates for the different components of an account.

5.2.1.2 Growth rates.

The presentation of estimates varies substantially from country to country. The method of presentation can be described as a matter of habit of the national accountants or as the preferences of the users. As already mentioned, some countries present this data in the form of graphs, other countries focus on the actual (before seasonal adjusted) data, at current and/or constant price levels.

However, the presentation through growth rates can be as follows:

- Current period on the same period of the previous year
- Current period on the previous period, also referred to as quarter-on-quarter percentage change
- Current period on the previous period at annual rate.

To clarify, annualised growth rates are defined as the percentage change or growth rate from one period (quarter) to the following period (quarter) converted to an annual rate i.e. as if the same changes were to permit over the next three quarters as well. It should be noted that in particular annualised rates might over emphasise the latest and most uncertain estimate (see paragraph 5.3.3 – Annualised rates).

5.2.1.3 The accounts

As previously mentioned, the economy of a country is presented through the national accounts. The national accounts are often present in the format of accounts. The annual GDP by industry estimates compiled from the production approach by Stats SA is presented in the production account format. The annual production accounts entails the entries in the accounts as well as the balancing item.

The South African situation is a mixture of the above. The following table shows what is published quarterly by Stats SA regarding the GDP estimates.

Table 15 – Presentation of quarterly GDP estimates published by Stats SA

• A graph drawn on the annualised percentage changes in the seasonally adjusted quarterly gross domestic product by industry at constant 1995 prices.
• Quarterly gross domestic product by industry at constant 1995 prices.
• Percentage change in the quarterly gross domestic product by industry at constant 1995 prices.
• Seasonally adjusted and annualised quarterly gross domestic product by industry at constant prices (R million)
• Annualised percentage change in the seasonally adjusted quarterly gross domestic product by industry at constant 1995 prices
• Quarterly gross domestic product by industry at current prices (R million)
• Compensation of employees by industry at current prices (R million)
• Gross operating surplus and net other taxes on production at current prices (R million)

Source: Stats SA: Statistical Release P0441 Gross Domestic Product, Fourth quarter 1999, 28 February 2000.

The presentation of annual GDP estimates published by Stats SA differs from the above and could be viewed in the November 1999 edition of the Statistical Release P0441 – Gross Domestic Product.

5.2.1.4 Remaining alternatives

As stated earlier, GDP estimates can be presented in levels, growth rates, accounts, matrixes, specific matrixes, graphs, indexes and formulas. Up to this point the first three of these alternatives were discussed. The remaining alternatives will not be discussed in detail, although some examples will be mentioned. The matrix presentation could be presented through the supply and use tables (SUT) and input-output tables. These two types of matrixes focus on production. Another type of matrix presentation is the social accounting matrix (SAM). Matrixes are often presented in a two dimensional presentation, where the data is presented in rows and columns.

The specific matrixes are investment matrixes and what is called the imports to use matrix. The import to use matrix reflects the intermediate use per industry and per private consumption expenditure.

Countries less frequently use the formula presentation. An example of this is the commodity flow equation, $P = C + I + X - M$.

Index presentation can be defined as the ratio between the value of a variable in a given period and its value in a base period. The base year values are equal to 100. The rate of change thereafter is then indexed.

5.2.2 Economic growth rate

The overall economic performance of a country is measured by the GDP estimates at constant prices. When analysing the change in the economy over time, the main concern is usually whether more goods and services are actually produced now than at some time in the past. Changes in GDP estimates at current prices show changes in monetary value of the industries' value added. These changes in monetary value can reflect changes in both price and quantity. It is difficult to establish how much of an increase is due to either increased activity in the economy, or to an increase in the prices level. As a result of this uncertainty, it is useful to compare GDP estimates at constant prices when analysing the real growth in the economy over time. GDP estimates at constant prices can be

presented through various alternatives (see paragraph 5.2.1 – Alternative presentations of quarterly gross domestic product estimates).

5.2.3 Purposes of quarterly national accounts[1/]

Quarterly national accounts share most of the purposes of annual national accounts, but with a different emphasis.[1/]

Most of the purposes of annual national accounts apply for quarterly national accounts, but as a result of the lesser detail, quarterly national accounts are not the most suitable for thorough analyses (see paragraph 5.3.2.1). Despite this, some of these purposes could be seen as characteristics of quarterly gross domestic product estimates in particular, and will therefore be briefly discussed.

- Quarterly national accounts serve as a framework for business cycle analysis. Quarterly national accounts provide data on economic activity and also serve as a coordinating framework for other data e.g. short term statistics on monthly manufacturing production indexes.
- Quarterly national accounts serve is an early indicator of economic development, especially when turning points in the business cycle are detected. This early detection of turning points is indispensable for economic policy.
- Quarterly national accounts serve as an early estimate of annual national accounts. This use is due to the time lag with which annual national accounts are produced. The first annual estimates can be derived as a sum of the four quarters of a calendar year.
- Finally, quarterly national accounts have the advantage over annual national accounts since quarterly national accounts provide a quadruple number of observations, which is very helpful for all kind of mathematical applications.

These specific purposes of quarterly national accounts should not let users concluded that annual national accounts could be replaced by quarterly national

[1/] Quarterly national accounts can in almost all instances be replaced with quarterly gross domestic product estimates in this situation.

accounts (compare paragraph 5.3.2 – Quarterly national accounts versus annual national accounts).

5.2.4 National accounts guides survey areas

The system of national accounts is a balanced system and as one of the results of this balanced system is that it helps to prioritise the collection of statistics. Therefore, the system of quarterly national accounts is used as a tool in influencing statistical developments as quarterly national accounts themselves are used to identify shortcomings and gaps in the base of statistical indicators.

5.2.5 Advantage of the production approach

GDP estimates compiled by applying the production approach are often presented as GDP by type of economic activity or GDP by industry. This industry composition presentation makes it particular suitable for deriving productivity measures, in conjunction with employment data, by industry. Furthermore, comparisons can be drawn between the industries by comparing their performances. The income and expenditure approaches have the limitation of measuring productivity in total compared to the production approach's industry breakdown.

In the next section some shortcoming of gross domestic product estimates will be discussed.

5.3 Shortcomings of gross domestic product estimates

A shortcoming of quarterly gross domestic product estimates is their coverage. Coverage refers to the coverage of the total economy i.e. the formal and informal, as well as certain industries which are not covered to the optimum. The quality of the estimates is hereby affected and is indirectly discussed in some of the sections to follow.

5.3.1 Limitations of national accounts

One major source of limitations of national accounts statistics, which is simultaneously one of the major advantages, concerns the consistency of the system. The consistency of the system, which is also regarded as one of the cornerstones of the national accounts, has an advantage and at the same time a disadvantage that it impedes simultaneous adoption of conflicting views. Most importantly, this effects the use of national accounts data as welfare indicators. More recently, the environment has been emphasised as an issue on which the coverage of the national accounts is deficient.

5.3.1.1 Welfare

One of the most important limitations of the national accounts is that the system does not describe welfare. A main aggregate of the system of national accounts such as gross domestic product (GDP) is often used as an indicator for welfare. It should be emphasised; that irrespective of the importance of the supply of goods and services of a country seems to be it is not the one and only factor that constitutes welfare. Factors that are not reflected in the national accounts but which have an important effect on welfare are, inter alia, political stability, health, income distribution, access to education, degree of labour satisfaction and pollution of the environment. Inclusion of these issues is barred trough the accounting rules that focus on observed market values and excludes externalities.

5.3.1.2 Observed market values

The focus of the national accounts is on economic stocks and flows which have an observed market value. However, an element such as own account production of goods is included in the national accounts, but does not meet this criterion. Other criticisms include the exclusion of personal services produced and consumed in the same household and the so-called do-it-yourself-activities. The main reason for this convention is that it would obscure the view on the traditional monetary part of the economy. Thus, household services would impair economic analyses

and obliterate the distinction between employed and unemployed in the employment statistics.

5.3.1.3 The environment

Another major criticism on the national accounts is that it does not take into account the effects of production and consumption on the environment. It is also known that production and welfare indicators that exclude the effect on the environment are misleading. A current proposal is to show the effect of the economy on the environment by subtracting the costs of redeeming or preventing damage caused by production and consumption from gross domestic product (GDP), as it is currently known. However, most leading national accounts compilers do not share these views (IMF institute, Overview of the System of National Accounts, 1997:18). A growing awareness is that the national accounts statistics need to accommodate an environmental perspective. It is a reality and should be further explored, investigated and developed.

5.3.1.4 Externalities

National accounts are designed and developed to focus on observed market values and do not account for externalities. Externalities is defined as the effects of economic actions that are not explicitly reflected in transactions between the participants or agents in the economy e.g. consumer surpluses and environmental deterioration.

5.3.2 Quarterly national accounts versus annual national accounts[2/]

5.3.2.1 Timeliness versus reliability and the need for revisions

When compiling quarterly national accounts a trade off exists. This trade off is between timeliness and quality. International best practices indicate a timeliness of three months for quarterly national accounts, thus the quality is effected by the

[2/] Quarterly and annual national accounts can in almost all instances be replaced with quarterly and annual gross domestic product estimates in this situation.

timeliness compared to annual national accounts and the reverse applies for annual national accounts compared with quarterly national accounts. "Annual national accounts are more reliable, are more detailed and more comprehensive" (IMF institute: Quarterly National accounts: Scope and Role,1997:4). Therefore, it is important that quarterly national accounts are firmly linked to a well developed and reliable system of annual national accounts.

In quarterly national accounts the emphasis is on timeliness whilst, for annual national accounts the emphasis is on the quality. Due to this emphasis, a negative effect is caused on the reliability of quarterly national accounts. Quarterly national accounts compared with annual national accounts, are limited because they are less in reliability, detail and comprehensiveness.

The five problems contributing to the lower reliability include a lack of observed data, existence of not readily observable activities, low early response rates, changes in sources over time and a short compilation period.

To a large extent these problems will be solved when more reliable and accurate data becomes available. These include the availability of annual data, but also short term data as the year progresses. This can imply that the quarterly national accounts estimates would be revised backwards due to the availability of more reliable indictors.

The advantage of quarterly national accounts over annual national accounts is their timeliness. Another advantage of quarterly national accounts over specific current indicators is their comprehensiveness.

A trade off exists between the quarterly and annual national accounts. This trade off is in respect of timeliness and quality.

Revisions to national accounts are not unusual. As previously mentioned, factors such as the availability of new source data, revisions in the source data and compilation errors emerging after the release of the data, render revisions an

inescapable fact of life for national accounts compilers (IMF institute, Overview of the System of National Accounts, 1997:16)

It is generally accepted that in the evolution from preliminary data to final data, revisions have to be made. Revisions should always be handled with caution as revisions could negatively impact on the reliability of data in general and national accounts specifically. Often compilers of national accounts aren't left any choices as new source data is released long after the national accounts statistics have been released.

5.3.2.2 Linking quarterly and annual national accounts

As stated before, quarterly national accounts compared with annual national accounts have a disadvantage. This disadvantage is quality and reliability. Therefore, this is the single most important reason to link quarterly national accounts with annual national accounts. Another advantage of linking quarterly and annual national accounts is that quarterly national accounts can be used to forecast the annual national accounts. Furthermore, the linking of these two sets of national accounts provides more transparency for users.

The linking of quarterly national accounts with annual national accounts does have problems. These two sets of national accounts do not give the same results. A reason for this is the difference in sources and methods used to compile these two sets of national accounts. Usually, the quarterly national accounts estimates have to adopt the annual totals. One of the problems that national accountants is facing is how to deal with the discrepancy. The discrepancy is the difference between the total (sum) of the four quarters, for any given calendar year, and the annual estimate of that same calendar year. In order to assist dealing with this difficulty, smoothing techniques exist and are being developed. Usually the quarterly national accounts estimates must be adopted to the total from the annual national accounts estimates.

5.3.3 Annualised rates

As previously mentioned, growth rates are on of the alternative presentation through which national accounts could be presented. Various types of growth rates could be used (compare paragraph 5.2.1.2 – Growth rates). When the constant prices quarterly GDP estimates are presented through annualised rates, some industries' performances could be skewed. This is especially when the industry is volatile e.g. the agriculture industry. Such an industry's growth rate is either too accentuated to the positive or to the negative side. If the growth of this industry had been expressed as quarter-on-quarter percentage change, the effect would have been less severe. An annualised growth rate of 46,2% is approximately 9,9% when expressed as a quarter-on-quarter percentage change. These diverse growth rates are calculated from the same levels expressed in monetary values. It should be noted that in particular annualised rates might over emphasise the latest and most uncertain estimate.

5.3.4 The informal sector

Often national accounts statistics are criticised for not including the informal sector. Although this criticism is not always true, it is rather difficult to do a proper estimation of the informal sector due to a lack of basic statistics. The lack of basic statistics is merely a result of the difficulty to measure the activity of the informal sector on the short term. To measure the informal sector to a satisfactory and sensible level is costly and resources are restricted.

The South African situation regarding the informal sector in the gross domestic product estimates (production side) is as follows. The informal sector was properly estimated on an industry level in the base year, 1995. As already mentioned it is difficulty and costly to gather statistics regarding the informal sector, and even worse to looking at quarterly statistics on the informal sector. Extrapolation factors are applied to estimate this part of the economy on a quarterly basis.

5.3.5 Disadvantage of the production approach

A typical feature of the production approach – applied on a quarterly basis – is its dependence on output data together with certain assumptions of fixed ratios. These ratios are of intermediate consumption to output and differ from industry to industry. Intermediate consumption and output are the two entries in the production account. Such ratios are given when applying the production approach on a quarterly basis. Some industry ratios will be up to 70%, while others could be close to 30%. These ratios are applied due to the lack of sufficient short term basic statistics. The assumption of fixed ratios can also be seen as a disadvantage of the production approach.

5.3.6 Discrepancies and the role of balancing

Different approaches (independently but simultaneously) used to compile GDP estimates (quarterly and annual) will result in discrepancies. Discrepancies are also referred to as the residual. Discrepancies are unavoidable when working with different approaches. Opinions differ on how to interpret and/or deal with a discrepancy. Discrepancies can be seen as an indication for the accuracy and reliability of basic statistics. In practice, discrepancies serve as a tool to confront these basic statistics. Discrepancies can be accepted and published or removed. Published discrepancies could cause confusion for the users, or can be seen as an indication of transparency.

Removing of discrepancies can be through proportional distribution or through selective attribution. The latter could be to allocate the discrepancy to one approach e.g. the expenditure approach, or to allocate it to one category e.g. changes in stocks.

To conclude, no consensus exits among international national accountants on how to deal with discrepancies or with conflicting data sources. Although, discrepancies can been seen as an indicator of unreliable data sources.

South Africa's annual and quarterly national accounts are published with the residual. Thus it is an accepted residual which is either added or subtracted from the GDP estimates calculated from the expenditure approach.

5.3.7 The change of base year

National accounts estimates at constant prices should not be compiled for too many years without a change of the base year. A reasons for changing the base year is, inter alia, that during the course of time, the pattern of relative prices prevalent in the base year, will become less and less relevant to economic situations in the periods to follow. Relative prices prevailing during a certain period have a decisive impact on numerous economic circumstances, e.g. production methods and consumption patterns. As time goes by and relative prices change, the economic circumstances also change accordingly. Therefore, to continue the calculation of national accounts at the prices of a base year in the far away past is of insignificant value, as the results tend to be less and less relevant. The base year must be changed or updated at regular intervals, preferably every fifth year.

A statistical agency should have a rebasing policy. It will also assist users of national accounts when to expect a rebased set of national accounts. Users of national accounts require long time series at constant prices, expressed at the prices of the same base year. The various variables needed not to be rebased for these long time series, but should be linked together in a year where they overlap. Users should take note that the sum of the components of an aggregate will not add up to the aggregate – it is no longer additive.

5.4 Conclusion

Although quarterly gross domestic product estimates are widely use for, inter alia, economic growth rate, an early indicator of turning points in economic development and fir business cycle analyses, these estimates do have some shortcomings. Some shortcomings are the reliability of the estimates and that these quarterly gross domestic product estimates are not a measurement of welfare.

Despite these shortcomings, quarterly gross domestic product estimates are crucial for economic planning and decision taking.

Chapter 6

Conclusion

6.1 Introduction

In the previous chapters the historical overview and the theoretical aspects of national accounting in general were discussed. Then the national accounts were narrowed to quarterly national accounts whereafter the quarterly gross domestic product estimates followed. Some characteristics and shortcomings of quarterly gross domestic product estimates were indicated in the chapter 5. Conclusions were made on each of these topics.

6.2 Conclusions drawn regarding the various chapters

Conclusions drawn regarding the various chapters will follow in the next section.

6.2.1 The 1993 System of National Accounts (1993 SNA)

The System of national accounts is a conceptually consistent and statistically integrated database of economic statistics, organised within the framework of a comprehensive accounting system. The 1993 SNA is a 760 pages document. The contents of the 1993 SNA can be summarised into five main groupings. A brief overview of the accounts were given i.e. the format of the accounts, the terminology used in the accounts, the balancing item of each account and finally some of the main aggregates were indicated. The boundaries applied to the national accounts, namely: the production -, legal and illegal - and the asset boundary, were discussed. Furthermore, definitions of annual, quarterly and regional accounts were touched on.

Although the 1993 SNA does not resolve all issues or meet all the specific requirements of policy makers, it recognises the need for alternative approaches and measures that can be dealt with through the development of satellite accounts, in parallel with the national accounts. This together with the implementation of

the recommendations provides new opportunities for national accountants and researchers to work in an interesting, challenging and rewarding environment.

6.2.2 Quarterly National Accounts

Quarterly national accounts can either be GDP estimates only, or consist of a full set of national accounts. No country has succeeded to compile quarterly balance sheets (SNA,1993:440). When taken data constraints and timeliness requirements into account, it seems unlikely for most countries to achieve a full set of the accounts on a quarterly basis. The sensibility of a set of accounts (including the balance sheets) can be questioned.

Although quarterly national accounts do have specific purposes, they can't replace the annual national accounts, as quarterly national accounts on their turn have their own purposes.

Methods used for the compilation of quarterly national accounts, are most likely the result of data availability rather than compilers of national accounts having made a choice between the three approaches. It is highly desirable that the sources and methods are well documented for later references.

A specific feature or aspect of quarterly national accounts is quarterly gross domestic product estimates and was discussed in the chapter.4

6.2.3 Quarterly gross domestic product estimates

Quarterly GDP estimates can be compiled by one of three approaches, which are the expenditure, production and income approach. Countries often apply these different approaches to compile quarterly GDP estimates. Usually the approach applied is a mirror picture of the available data sources. An advantage of the production approach is its industry breakdown, and therefore, the various comparisons which could be done on such a breakdown.

Basic statistics are used to compile GDP estimates. These statistics can broadly be grouped into categories. The categories are as follow: physical quantities, other

volume indicators, financial data, indirect indicators e.g. employment and hours worked and trend factors or extrapolation.

Related to basic statistics is the under-coverage of it. Most countries do have gaps in their coverage of quarterly gross domestic product estimates. Gaps are due to a lack of suitable basic statistics and national accounts compilers should always strive to reach the ideal data requirements.

6.2.4 Characteristics and shortcomings of gross domestic product estimates

Quarterly gross domestic product estimates are widely use for, inter alia, economic growth rate, an early indicator of turning points in economic development and for business cycle analyses which can simultaneously be seen as characteristics of quarterly gross domestic product estimates. Although quarterly gross domestic product estimates do have a number of uses, these estimates do have some shortcomings. Some shortcomings are the reliability of the estimates and that these quarterly gross domestic product estimates are not a measurement of welfare.

Despite these shortcomings, quarterly gross domestic product estimates are crucial for economic planning and decision taking, as it is the only consistent set of statistics which are available shortly after the reference period.

6.3 Recommendations for further research

6.3.1 Alternatives to present quarterly gross domestic product estimates

The effects on the financial markets regarding the perceptions of analysts on different growth rates presentations of quarterly gross domestic product estimates could be of special interest for national accounts compilers.

6.3.2 Seasonal adjustment of quarterly gross domestic product estimates

The results of different methods applied to seasonal adjust the quarterly gross domestic product estimates. This includes the level of aggregation on which the seasonal adjustment is done.

6.3.3 The quality of indicators used for the compilation of quarterly gross domestic product estimates

The quality of indicators used for the compilation of quarterly gross domestic product estimates with special reference to the type of volume indicators used for the compilation of quarterly gross domestic product estimates at constant prices. This could be valuable to national accounts compilers.

6.4 Conclusion

This study aimed to indicate some characteristics and shortcomings of quarterly gross domestic product estimates. A number of these characteristics were identified and discussed. Although GDP estimates have become an everyday life phenomenon, it has limitations and restrictions.

Users of national accounts statistics in general and GDP estimates in particular should be aware of these shortcomings when applying these figures.

Annexure A - Statistical sources and methods

Table 16 summarises the most important statistical sources from which the annual and quarterly value added and GDP estimates are derived and the method used to compile the figures, discussing both the estimates at current and at constant prices. The term "benchmark years" refers to those years in respect of which authoritative and detailed information is available.

Table 16 - Statistical sources and methods used in estimating annual and quarterly value added and GDP at current and at constant prices

Industry	Annual estimates at current prices	Quarterly estimates at current prices	Estimates at constant prices
Agriculture	Benchmark years: Periodic Censuses of Agriculture conducted by Stats SA. GDP estimates compiled by the National Department of Agriculture in co-operation with Stats SA. Other years: Annual surveys of agriculture conducted by Stats SA. GDP estimates are compiled by the Department of Agriculture in collaboration with Stats SA. Estimates from censuses and surveys are verified against quarterly source data collected by the National Department of Agriculture. Estimates include the value of farm produce consumed by farmers for own account.	Information obtained from various marketing agents and other agricultural related organisations in respect of the value of production of field crops, horticulture and livestock. Expenditure on intermediate goods is collected by the National Department of Agriculture from a number of manufacturers and associations regarding, inter alia, fertilisers, farm feed, dips and sprays, and fuel.	Nominal values (current prices) of production and intermediate inputs are deflated by appropriate price indices compiled by the National Department of Agriculture.
Forestry	Benchmark and other years: Annual information obtained from the Department of Water Affairs and Forestry. Estimates of growing forests and own-account production are based on a research project conducted by UP	Judgemental trend.	Base year estimates are extrapolated using volumes of harvested timber and changes in standing timber inventories.
Fishing	Benchmark and other years: Information provided by the Marine Development Branch of the Department of Environmental Affairs and technical periodicals.	Information provided by the Marine Development Branch of the Department of Environmental Affairs and technical periodicals.	Base year estimates are extrapolated using appropriate indices of the quantity (volume) of fish caught.

Table 16 - Statistical sources and methods used in estimating annual and quarterly value added and GDP at current and at constant prices (continued)

Industry	Annual estimates at current prices	Quarterly estimates at current prices	Estimates at constant prices
Mining and quarrying	Benchmark years: Periodic Censuses of Mining conducted by Stats SA. Results from the 1993 and 1996 mining censuses are included. Other years: Monthly data on production and sales for the various sectors of the mining industry and the quarterly surveys of financial and labour statistics conducted by Stats SA. Supplemented by information from the Chamber of Mines regarding the gold-mining industry and sample surveys conducted by the SARB.	Monthly data on production and sales for the various sectors of the mining industry and the quarterly surveys of financial and labour statistics conducted by Stats SA. Supplemented by information from the Chamber of Mines regarding the gold-mining industry and sample surveys conducted by the SARB.	Base year estimates are extrapolated using appropriate indices of output quantities of various sectors of mining. Information obtained from the Chamber of Mines, the Minerals Bureau, the Department of Minerals and Energy and Stats SA.
Manufacturing	Benchmark years: Periodic Censuses of Manufacturing conducted by Stats SA. Results from the 1993 and 1996 manufacturing censuses are included. Other years: Monthly data on production and sales of the manufacturing industry, quarterly surveys of financial and labour statistics conducted by Stats SA, supplemented by sample surveys conducted by the SARB.	Monthly data on production and sales of the manufacturing industry, quarterly surveys of financial and labour statistics conducted by Stats SA, supplemented by sample surveys conducted by the SARB.	Base year estimates are extrapolated using appropriate indices of output quantities (volume) based on manufacturing sales at constant prices for the various divisions of manufacturing.
Electricity and water	Benchmark and other years: Annual statistics and financial statements obtained from ESKOM, the water boards and local authorities.	Monthly survey regarding generation and consumption of electricity conducted by Stats SA as well as monthly surveys conducted by the SARB.	Base year estimates are extrapolated using appropriate indices of output quantities (units of electricity generated and kilo litre water).

Table 16 - Statistical sources and methods used in estimating annual and quarterly value added and GDP at current and at constant prices (continued)

Industry	Annual estimates at current prices	Quarterly estimates at current prices	Estimates at constant prices
Construction	Benchmark years: Periodic Censuses of Construction conducted by Stats SA. Results from the 1994 construction census are included. Other years: Extrapolation of the benchmark year estimates according to the trend in gross domestic fixed investment of residential and non-residential buildings and construction works as compiled by the SARB. Verified with the monthly survey of building statistics conducted by Stats SA. Labour remuneration is extrapolated according to the quarterly survey of total employment and earnings conducted by Stats SA.	Extrapolation of the benchmark year estimates according to the trend in gross domestic fixed investment of residential and non-residential buildings and construction works as compiled by the SARB. Verified with the monthly survey of building statistics conducted by Stats SA. Labour remuneration is extrapolated according to the quarterly survey of total employment and earnings conducted by Stats SA.	Base year estimates are extrapolated using the trend in real gross domestic fixed investment of residential and non-residential buildings and construction works as well as the monthly survey of building statistics conducted by Stats SA. Verified by cement sales.
Wholesale, retail and motor trade	Benchmark years: Periodic Censuses of Wholesale Trade, Commercial Agents and Allied Services; Retail Trade; and Motor Trade and Repair Services, conducted by Stats SA. Annual and quarterly surveys of local authorities conducted by Stats SA. The results of the above-mentioned censuses for 1993 are included. Other years: Monthly surveys of financial (turnover) statistics of wholesale, retail and motor trade and the quarterly survey of total employment and earnings conducted by Stats, supplemented by sample surveys conducted by the SARB.	Monthly surveys of financial (turnover) statistics of wholesale, retail and motor trade and the quarterly survey of total employment and earnings conducted by Stats, supplemented by sample surveys conducted by the SARB.	Base year estimates are extrapolated using indices for the volume of wholesale, retail and motor trade sales.

Table 16 - Statistical sources and methods used in estimating annual and quarterly value added and GDP at current and at constant prices (continued)

Industry	Annual estimates at current prices	Quarterly estimates at current prices	Estimates at constant prices
Catering and accommodation	Benchmark years: Periodic Censuses of Catering and Accommodation Services and Licensed Restaurants, conducted by Stats SA. The results of the 1995 census of accommodation services and the 1992 census of restaurants are included. Other years: Extrapolation according to the trend of retail trade sales and trading statistics for hotels published by Stats SA.	Extrapolation according to the trend of retail trade sales and trading statistics for hotels published by Stats SA.	Base year estimates are extrapolated using changes in indices for room and bed nights sales.
Transport and communication	Benchmark and other years: Financial reports of Transnet, Telkom, SA Post Office; annual and quarterly surveys of local authorities conducted by Stats SA. Private transport benchmark estimates are obtained from Censuses of Transport and Allied Services conducted by Stats SA. Estimates for in-between years of private transport are extrapolated according to the monthly survey of transport of goods and passengers by road and rail conducted by Stats SA. Supplemented by individual studies such as for the taxi industry, the cellular networks and the internet service providers.	Financial information from Transnet, Telkom, SA Post Office; annual and quarterly surveys of local authorities conducted by Stats SA. The monthly survey of transport of goods and passengers by road and rail conducted by Stats SA. Supplemented by individual studies such as for the taxi industry, the cellular networks and the internet service providers. Supplemented by surveys conducted by the SARB.	Base year estimates are extrapolated using appropriate indices of the volume of services rendered by the various institutions.

Table 16 - Statistical sources and methods used in estimating annual and quarterly value added and GDP at current and at constant prices (concluded)

Industry	Annual estimates at current prices	Quarterly estimates at current prices	Estimates at constant prices
Financial intermediation and insurance	Benchmark and other years: Annual and quarterly surveys conducted by the SARB among the various institutions in the private sector and information reported by public authorities and public corporations.	Annual and quarterly surveys conducted by the SARB among the various institutions in the private sector and information reported by public authorities and public corporations.	Base year estimates are extrapolated using appropriate indices, verified by nominal transactions deflated by appropriate price indices.
Real estate (including imputed rent on residential buildings) and business services	Benchmark and other years: Censuses of Business Services and the 1996 Population Census. Supplemented by individual studies such as for car rentals and the security industry.	The monthly survey of building statistics conducted by Stats SA and monthly price indices of rent. Judgemental estimates for business services.	Base year estimates are extrapolated using an index of the estimated number of houses. For business services various volume indicators as well as price indices are used supplemented by judgemental estimates.
Other private services	Benchmark years: Censuses of Social Services. Results from the 1994 Censuses of Health are included. Other years: Extrapolated by relevant items of private consumption expenditure estimated by the SARB.	Extrapolated by relevant items of private consumption expenditure estimated by the SARB.	Nominal values (current prices) deflated by relevant components of the Consumer Price Index (CPI).
General government services	Benchmark years: Government Financial Statistics (GFS) analysis. Other years: Annual Main Budget of South Africa as published in the Budget Review and annual statistics on the provincial governments and local authorities and extra-budgetary accounts.	Quarterly survey of total employment and earnings of the public sector conducted by Stats SA.	Base year estimates are extrapolated using an index of employment by general government.
Other producers	Benchmark and other years: Censuses of relevant social services, such as welfare organisations, supplemented by the 1996 Population Census and annual reports of relevant non-profit institutions.	Judgmental.	Nominal values (current prices) deflated by relevant components of the CPI and verified by the GDP deflator.

Source: Stats SA: Statistical Release P0441 Gross Domestic Product – Revised estimates 1993 – 1998, First quarter 1999, 22 June 1999.

Annexure B - Classification of Industries

The industries used in estimating the value added was classified according to the Standard Industrial Classification of all Economic Activities (SIC), fifth edition. It is based on the third revision of the International Standard Industrial Classification of all Economic Activities (ISIC), with suitable adaptations for local conditions.

For the convenience of users, the SIC is duplicated in this statistical release for easy reference. Two versions of SIC are presented, namely table 17 reflecting only those categories of the SIC which have actually been used in the national accounts tables in this statistical release and table 18 which is the full version of SIC (5th edition). Furthermore, table 17 also furnishes the abbreviated titles as used in the national accounts tables.

Table 17 - Categories used in the national accounts tables

Title in the national accounts tables	Major division of SIC	Division of SIC
Agriculture, forestry and fishing	1	
Agriculture		11
Forestry		12
Fishing		13
Mining and quarrying	2	
Coal mining		21
Gold mining		23
Mining of other metal ores		24
Other mining and quarrying		25, 29
Manufacturing	3	
Food, beverages and tobacco products		30
Textiles, clothing and leather goods		31
Wood and paper; publishing and printing		32
Petroleum products, chemicals, rubber and plastic		33
Other non-metallic mineral products		34
Metals, metal products, machinery and equipment		35
Electrical machinery and apparatus		36
Radio, TV, instruments, watches and clocks		37
Transport equipment		38
Furniture; other manufacturing		39
Electricity and water	4	
Electricity		41
Water		42
Construction	5	
Wholesale, retail, and motor trade; catering and accommodation	6	
Wholesale trade		61
Retail trade; repair of household goods		62
Motor trade; repair of motor vehicles		63
Catering and accommodation		64

Table 17 - Categories used in the national accounts tables (concluded)

Title in the national accounts tables	Major division of SIC	Division of SIC
Transport and communication	7	
Transport		71-74
Communication		75
Finance, real estate and business services	8	
Finance and insurance		81-83
Real estate		84
Business services		85-88
Other private services	9 1/	
General government services	9 1/	
Other producers	9 1/	01 1/

Source: Stats SA: Statistical Release P0441 Gross Domestic Product – Revised estimates 1993 – 1998, First quarter 1999, 22 June 1999.

1/ Major division 9 of SIC - Community, social and personal services - has been disaggregated into three categories in the national accounts tables. These categories follow other criteria than SIC and cannot be defined in terms of the divisions and groups of SIC 9. The first category - Community, social and personal services - includes private enterprises. They are market producers. The second category - general government services - comprises the activities of general government in producing non-market community and social services, e.g. public administration, defence, health and education. The third category - Other producers - consist of non-profit institutions serving households (NPISH) and domestic workers. These are also non-market producers.

Table 18 - Standard Industrial Classification of All Economic Activities (SIC) (5th Edition)

Title of category	Major division	Division
Agriculture, hunting, forestry and fishing	1	
Agriculture, hunting and related services		11
Forestry, logging and related services		12
Fishing, operation of fish hatcheries and fish farms		13
Mining and quarrying	2	
Mining of coal and lignite		21
Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying		22
Mining of gold and uranium ore		23
Mining of metal ores, except gold and uranium		24
Other mining and quarrying		25
Services activities incidental to mining of minerals		29
Manufacturing	3	
Manufacture of food products, beverages and tobacco products		30
Manufacture of textiles, clothing and leather goods		31
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials; manufacture of paper and paper products; publishing, printing and reproduction of recorded media		32
Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals and chemical products; manufacture of rubber and plastic products		33
Manufacture of other non-metallic mineral products		34
Manufacture of basic metals, fabricated metal products, machinery and equipment and of office, accounting and computing machinery		35
Manufacture of electrical machinery and apparatus n.e.c.		36
Manufacture of radio, television and communication equipment and apparatus and of medical, precision and optical instruments, watches and clocks		37
Manufacture of transport equipment		38
Manufacture of furniture; manufacturing n.e.c.; recycling		39
Electricity, gas and water supply	4	
Electricity, gas, steam and hot water supply		41
Collection, purification and distribution of water		42
Construction	5	
Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods; catering and accommodation	6	
Wholesale and commission trade, except of motor vehicles and motor cycles		61
Retail trade, except of motor vehicles and motor cycles; repair of personal household goods		62
Sale, maintenance and repair of motor vehicles and motor cycles; retail trade in automotive fuel		63
Catering and accommodation		64

Table 18 - Standard Industrial Classification of All Economic Activities (SIC) (5th Edition) (concluded)

Title of category	Major division	Division
Transport, storage and communication	7	
Land transport; transport via pipelines		71
Water transport		72
Air transport		73
Supporting and auxiliary transport activities; activities of travel agencies		74
Post and telecommunications		75
Financial intermediation, insurance, real estate and business services	8	
Financial intermediation, except insurance and pension funding		81
Insurance and pension funding, except compulsory social security		82
Activities auxiliary to financial intermediation		83
Real estate activities		84
Renting of machinery and equipment, without operator, and of personal and household goods		85
Computer and related activities		86
Research and development		87
Other business activities		88
Community, social and personal services	9	
Public administration and defence activities		91
Education		92
Health and social work		93
Other community, social and personal service activities		94
Activities of membership organisations n.e.c.		95
Recreational, cultural and sporting activities		96
Other service activities		99
Private households, exterritorial organisations, representatives of foreign governments and other activities not adequately defined	0	
Private households with employed persons		01
Exterritorial organisations		02
Representatives of foreign governments		03
Other activities not adequately defined		04

Source: Stats SA: Statistical Release P0441 Gross Domestic Product – Revised estimates 1993 – 1998, First quarter 1999, 22 June 1999.

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