Article: Quarterly Bulletin

June 1999

South African Reserve Bank

Revision of South Africa's national accounts

By J.W. Prinsloo

CONTENTS

List of tables

Revision of South Africa's national accounts[1)]

by J.W. Prinsloo

Introduction

In this issue of the *Quarterly Bulletin* and the accompanying supplement, the South African Reserve Bank in cooperation with Statistics South Africa presents revised estimates of the national accounts of South Africa for the period 1946 to 1998. Comprehensive revisions had to be made to the national accounts in order to incorporate new data that have become available, to reclassify certain transactions and to rebase estimates at constant prices. This is the sixth time that revisions of this kind have been made in South Africa. The current comprehensive revision updates and extends the national accounts estimates for the years 1946 to 1998 as published in a supplement to the *Quarterly Bulletin* of June 1994.

In addition to these changes, the current revisions also incorporate the relevant recommendations made in the new international *System of National Accounts 1993* (1993 SNA) which was published in 1993. Ongoing economic developments have led to the need for new methodologies to improve economic measurement in changing circumstances. The outcome has been the 1993 SNA, which replaces the 1968 version of the *System of National Accounts* published by the United Nations.

Although it was not possible to accommodate all the recommendations and new principles of the 1993 SNA, the introduction of the 1993 SNA will at least ensure that South Africa's national accounts are, as far as possible, in keeping with commonly used international standards.

In comprehensive revisions the following kinds of changes are usually made:

- Definitional and classificational changes, which update the accounts in order to keep pace with developments in the South African economy and international best practices;
- statistical changes, which reflect a shift in the base period for the calculation of constant-price estimates and the associated price indices, revised sources of data and improved estimating procedures; and
- the redesigning of tables to include or omit series that reflect definitional and classificational changes or to make tables more informative.

Comprehensive revisions therefore differ from the regular annual national accounts revisions in the scope of the changes being made and the length of the period to which the revisions apply. In the current comprehensive revision, the definitional and classificational changes had to be made mainly because of the implementation of the recommendations of the 1993 SNA. Statistical procedures were adjusted in so far as it was necessary to allow for the incorporation of newly available data sources, methodological changes according to the recommendations of the 1993 SNA and the new as well as revised data contained in familiar and often-used sources of statistical information.

The current revisions draw upon information from all the relevant censuses released between 1994 and 1999, the 1995 income and expenditure survey of households and the results of the population census of 1996 (after an upward adjustment of the preliminary results). In some cases the methods of calculation had to be changed in view of problems encountered with the availability and reliability of data sources. New information about unrecorded and informal economic activities has also been included in the revised national accounts statistics.

The purpose and background of rebasing

National accounts data at constant prices are constructed to measure changes in the volume or quality of goods and services produced or utilised. The statistical procedure for measuring volume changes in a macroeconomic aggregate between a chosen base period and the current period, consists of revaluing the aggregate in question in the current period at the prices of the base period and then calculating the change between these two periods. This procedure eliminates the effects of price changes from the base period to the current period, by recalculating the value of aggregate output and expenditure in terms of the prices of goods and services in the base period. The prices in the selected base period are therefore a factor in determining the real values of the different goods and services that are included in total output and expenditure in the other periods.

Relative values change over time because prices generally do not rise or decline at the same rate from one period to another. Reasons for shifts in relative prices include changes in supply and demand, different rates of change in productivity in different industries, changes in the quality of products, technological advances, tax changes, international price movements and exchange rate adjustments. To ensure that relative values, and therefore weighted average volume chan-

1) A comprehensive overview of national accounts definitions and the methodology followed in preparing national accounts estimates for South Africa is available. Statistical tables containing estimates of the annual national accounts aggregates dating back to 1946 and quarterly estimates dating back to 1960 are also incorporated in this overview. The full document is available upon request from the Economics Department of the Reserve Bank and can be accessed on the Internet at the Bank's website (www.resbank.co.za)

ges, approximate the current structure of the economy as closely as possible, base periods and weights have to be changed from time to time.

The 1993 SNA suggests that constant price series should not be allowed to run for longer than five or at most ten years without changing the base year. It recommends, however, that the base year should be changed every five years. For this reason, South Africa's national accounts data at constant prices have been rebased, using 1995 instead of 1990 as the new base year.

The shift in the base year changes the units (rand value) in which output and expenditure volumes are measured, and the difference in the level between the previously published and revised series primarily reflects the difference in the unit of measurement. For example, rebasing from 1990 prices to 1995 prices approximately doubles the level of real gross domestic product, reflecting essentially the increase in the level of prices from 1990 to 1995. It does not indicate a doubling in the output or expenditure volumes.

The new constant price series, with 1995 as the base year, have been calculated for the period from 1993 onwards. This allows for changes in the growth rates on account of changes in the weighting structure, while at the same time ensuring that the weights used in the measurement of changes in real national accounts aggregates between 1990 and 1995 reflect reasonably closely the relevant price and quantity structure for this period. The previously estimated series expressed in terms of constant 1990 prices have been retained for the period up to 1992 and been linked to the new series without being reweighted. However, owing to the magnitude of some revisions, it was necessary to allow for a gradual phasing-in period prior to 1993 to accommodate the underlying revisions for certain aggregates. This implies that in those cases, the growth rates at constant prices before 1993 could change accordingly.

So as not to disturb the previously existing rates of change in volume series up to 1993, subtotals and totals have been converted to 1995 prices, independently of their components. As a result, these converted subtotals and totals for periods before 1993 are not equal to the sums of their components. This means that the constant price figures do not "add up" in an accounting sense.

Revisions

During the current revisions of the national accounts statistics, the Economics Department of the Reserve Bank cooperated closely with Statistics South Africa and the National Department of Agriculture. Statistics South Africa and the Bank jointly concentrated on estimating the gross domestic product at current and constant prices, whereas the National Department of Agriculture was mainly responsible for estimating output and intermediate expenditure in the agricultural sector and private consumption expenditure on food, beverages and tobacco at current and constant prices. In addition, the Bank was responsible for the revision of the other major components of gross domestic expenditure at current and constant prices, as well as for the compilation of a full set of national and institutional accounts for South Africa.

Revision of gross domestic product

The revision of gross domestic product at current prices used the statistical input that had become available from various censuses and other technical reports. The following resources were particularly important: the 1993 census of agriculture; the 1993 and 1996 censuses of mining; the 1993 and 1996 censuses of manufacturing; the 1994 census of construction; preliminary results of the 1993 census of the wholesale, retail and motor trade, and several other similar reports. In addition, a few technical reports regarding the forestry industry, the taxi industry and information on medical aid schemes, micro lenders and other business services were included in the final analysis.

The contributions of gross value added by kind of economic activity between the 1990 and the 1995 benchmark estimates are presented in Table 1. Gross value added at factor costs and at basic prices for 1990 are not strictly comparable, because of the adjustment for other taxes and subsidies on production. In addition, some revisions such as the incorporation of work-in-progress of the forestry industry, new information on compensation in kind of domestic workers, the adjustment of value added on account of revised estimates of activity in the taxi industry, private security forces, the inclusion of micro lenders and the distribution of financial intermediation services indirectly measured (FISIM) between the various sectors of the economy, were responsible for the changes in the composition of the aggregates accounting for total value added at current prices. As a result of these developments, the weights used to extrapolate the base-year estimates of gross value added at basic prices and at constant prices in 1995 differ substantially from the weights that were used with the base year fixed at 1990 prices.

A comparison of the contribution of the various sectors of economic activity to total gross value added at basic prices between 1990 and 1995, shows some important changes in the weights of the particular sectors in the two base-year periods. On the revised basis, the primary sector's contribution to gross value added at current prices declined from nearly 14 per cent in 1990 to about 11 per cent in 1995. The contribution to total value added by the agricultural, forestry and fishing sector as well as that of the mining and quarrying sector declined. As a percentage of total gross value added, these two sectors' contribution declined from 4½ per cent and 9 per cent in 1990 to about 4

Table 1. Contribution of gross value added by kind of economic activity to total value added

Sectors	At factor cost	At basic prices	
	1990	1990	1995
	Per cent	Per cent	Per cent
Primary sector	**15,0**	**13,8**	**10,8**
Agriculture, forestry and fishing	5,3	4,6	3,8
Mining and quarrying	9,7	9,2	7,0
Secondary sector	**33,3**	**30,9**	**27,9**
Manufacturing	25,4	23,6	21,2
Electricity, gas and water	4,4	4,0	3,5
Construction	3,5	3,3	3,2
Tertiary sector	**51,7**	**55,3**	**61,3**
Wholesale and retail trade, catering and accommodation	15,0	14,3	14,3
Transport, storage and communication	7,5	8,2	8,9
Financial intermediation, insurance, real estate and business services	14,5	13,7	16,4
General government services	13,8	14,3	16,2
Other services	1,8	1,8	2,7
Other producers	2,2	3,0	2,8
Less: Financial intermediation services indirectly measured (FISIM)	3,1	...	...
Total value added	**100,0**	**100,0**	**100,0**

per cent and 7 per cent, respectively in 1998. The decline clearly reflects the declining role played by the resource producing industries. Especially the output of gold mines was badly affected by the declining quality of ore milled. In the case of the agricultural sector, value added was diminished by a severe drought in the summer rainfall areas in 1995. In addition, farm profits also came under pressure from low-priced imports of agricultural products following deregulation.

The secondary sectors' share of total value added shrank from 31 per cent in 1990 to almost 28 per cent in 1995. In addition to small declines in the relative contributions of the electricity, gas and water sector and the construction sector, the manufacturing sector's contribution declined from 23½ per cent in 1990 to 21 per cent in 1995. This decline was the result of a downward revision of the gross value added by the manufacturing sector according to the 1993 and 1996 census results for manufacturing and the upward adjustment in the total value added by the services sectors.

By contrast, the contribution of the services sector to total value added at basic prices rose from 55½ per cent in 1990 to approximately 61½ per cent in 1995. The increase in the tertiary sector's share as a percentage of the gross value added, stemmed mainly from the higher levels of output recorded by the transport and communication sectors, financial and other business services, and the general government. Revised estimates of the size of the taxi industry and the cellular phone networks contributed to an upward adjustment of total output in the transport, storage and communication sector. Likewise, value added by the financial and business services institutions was boosted by a strong rise in consulting, security and micro-lending activities.

Measured growth in the revised estimates of real gross domestic product, for 1995 and thereafter, deviates somewhat from the previously published growth rates. For example, the growth rates of real value added by the agricultural sector of -15 per cent, 29 per cent, and -1 per cent in 1995 to 1997 were changed to -19 per cent, 24 per cent and 2½ per cent, respectively. These changes were partly the result of the new approach to disaggregate agricultural output into subsectors. Real gross income is now estimated for all the identified subsectors, whereas previously only aggregate real gross farm income was estimated. Though the growth rates before and after the revisions showed little change in the case of the mining industry, the growth rates of the manufacturing sector of 3½ and -1½ per cent for 1997 and 1998 were revised downwards to 2½ and -2 per cent respectively. For the construction sector, the growth rates of less than 2 per cent, 1½ per cent and less than ½ per cent in 1996 to 1998 were revised upwards to 2 per cent, 2½ per cent and 2 per cent, respectively. These changes were broadly in keeping with developments in real fixed capital formation in residential and non-residential buildings, and construction works. In addition, the annual growth rates of the transport, storage and communications sector increased substantially from 3 per cent, 2½ per cent and 2 per cent in 1996 to 1998, to 6½ per cent, 6½ per cent and 6 per cent. These more sizeable revisions were due to the revisions of output recorded by the private transport industry, particularly by taxis, and the expansion of the cellular and telephone network activities recorded by Telkom. Furthermore, the growth rates recorded by the financial intermediation, insurance, real estate and business services sector were also revised upwards from 3½ per cent, 2½ per cent and 2½ per cent in 1996 to 1998 to 6½ per cent, 4½ per cent and 3½ per cent, respectively. These higher growth rates can mainly be attributed to new information and strong growth in real value added by business services during the second half of the 1990s. The changes in the growth rates of the various sectors of economic activity contributed to an upward adjustment in the growth rates of total gross domestic product at market prices for the years 1996 to 1998, i.e. from 3 per cent, 1½ per cent and almost 0 per cent in the three years to 4½ per cent, 2½ per cent and ½ per cent, respectively.

Table 2 presents the changes in the average annual real growth rates for the period 1993 to 1998. The average annual real growth rate of the primary sector remained unchanged at ½ per cent. This was the net result of lower growth in the agricultural sector which was offset by smaller negative growth in the mining sector. Positive real growth in the secondary sector showed no change from an average level of 2½ per cent recorded between 1993 and 1998. Small increases in the average annual real growth rates by the sector supplying electri-

Table 2. Percentage change in gross value added by kind of economic activity, 1993 to 1998

Sectors	Compound annual rates at 1990 prices	Compound annual rates at 1995 prices
Primary sector	**0,5**	**0,4**
Agriculture, forestry and fishing	3,8	1,7
Mining and quarrying	-1,3	-0,5
Secondary sector	**2,4**	**2,4**
Manufacturing	2,4	2,2
Electricity, gas and water	3,4	3,6
Construction	1,2	2,6
Tertiary sector	**2,2**	**3,1**
Wholesale and retail trade, catering and accommodation	3,0	2,2
Transport, storage and communication	3,4	6,8
Financial intermediation, insurance, real estate and business services	2,9	4,3
General government services	0,5	0,8
Other services	1,8	4,5
Other producers	1,8	1,3
Total gross value added at basic prices	**2,0**[1]	**2,6**
Taxes *net* of subsidies on products	3,7[2]	3,7
Gross domestic product at market prices (GDP)(P)	**2,2**	**2,7**

1) Gross domestic product at factor cost
2) "Indirect" taxes net of subsidies

city, gas and water and the construction sector, were neutralised by a slight downward revision of the estimated growth of manufacturing output in the corresponding period. In the services sector, the estimated annual real growth between 1993 and 1998 increased from 2 per cent to 3 per cent. This could mainly be attributed to the higher growth in transport, communication, financial and other services and in the community, social and personal services sectors, which more than offset the somewhat lower growth in the sector commerce.

Revision of the components of gross domestic expenditure

Revisions of the components of gross domestic expenditure were made possible by the results of the 1995 Survey of Income and Expenditure of Households, supplemented by the 1996 Population Census results, a thorough analysis of certain components of households' consumption expenditure, and of the income and expenditure of general government at all levels, the incorporation of new information on gross fixed capital formation and the book value of inventories surveyed by the recent censuses of mining, manufacturing, construction and commerce.

The revised estimates of consumption expenditure by households were based on data obtained from

- the survey of Income and Expenditure of Households, conducted by Statistics South Africa in 1995;
- a study by the Bureau of Market Research of the University of South Africa, with the objective of calculating household expenditure in 1999 by all population groups in South Africa; and
- the findings of special research projects such as those for the taxi industry, medical-aid schemes, the expenditure by private households on financial services and the imputed rent for owner-occupied dwellings.

By integrating all the relevant data sources, spending by the average household was calculated for different population groups in each of the nine provinces. These average expenditure aggregates were multiplied by the number of households per population group in the provinces in order to obtain an estimate of aggregate private consumption expenditure.

All subcategories of household expenditure were revised. The extent of the revisions varied from small to

Table 3. Percentage change in components of gross domestic expenditure and gross domestic product aggregates, 1993 to 1998

Components	Compound annual rates at 1990 prices	Compound annual rates at 1995 prices
Final consumption expenditure by:		
- Households....................................	2,9	3,6
- General government.......................	3,7	0,9
Gross fixed capital formation	**7,5**	**7,3**
Change in inventories[1]	**1,5**	**3,7**
Gross domestic expenditure	**3,5**	**3,4**
Exports of goods and services	5,5	6,3
Imports of goods and services	10,0	9,7
Expenditure on gross domestic product		
GDP(E) at market prices[2]	**2,4**	**2,8**
GDP(P) at market prices[3]	**2,2**	**2,7**
GDP(I) at market prices[4]	**2,7**	**3,1**
GDP(A) at market prices[5]	**2,4**	**2,8**

1) Change in the variable as percentage of GDP(P) at the beginning of the period
2) Gross domestic product on expenditure base, i.e. the total of consumption expenditure, gross capital formation, export of goods and services *minus* imports of goods and services
3) Gross domestic product on the production base, i.e. real output *less* intermediate input
4) Gross domestic product on the income base, i.e. the sum of factor incomes at current prices deflated by the implied deflator for GDP (E)
5) Average measure of gross domestic product, i.e. average of GDP(E), GDP(P) and GDP(I)

fairly substantial in the case of certain categories. Only marginal adjustments were made to benchmark-year estimates of the expenditure on durable, semi-durable and non-durable goods. Sizeable revisions were made to the estimates of expenditure on telecommunication services, transport services and rentals, including the estimates of imputed rent for owner-occupied dwellings.

In the period 1993 to 1998 (see Table 3) the average annual growth in real outlays on final consumption expenditure by households increased from 3 per cent to 3½ per cent. This upward adjustments were more pronounced in 1996 and 1997 when growth rates of 4 per cent and 2 per cent were re-estimated as 5 per cent and 2½ per cent, respectively.

The calculated consumption expenditure by general government was revised in accordance with the latest information available on current expenditure by general government at the national, provincial and local levels. As a result of these revisions, the composition of total expenditure on goods and services by the general government, which consists mainly of salaries and wages and "other" goods and non-labour services, has changed noticeably since the beginning of the 1990s. The share of compensation of employees in the total consumption expenditure by general government rose from an average of about 61 per cent in the beginning of the 1990s to nearly 70 per cent in the second half of the 1990s. These developments also impacted on the growth in aggregate final consumption expenditure by general government which was revised downwards from an average yearly rate of 3½ per cent in 1993 to 1998 to 1 per cent.

The revised estimates of gross fixed capital formation and inventory investment originated from the incorporation of new information obtained from the various industry census results. The 1995 report on building plans passed and buildings completed, up-to-date information received from public corporations, the 1998 statistical survey of actual and expected capital expenditure by the public sector, and an analysis of expenditure by general government, were all taken into account in preparing the estimates of capital formation.

Real outlays on gross fixed capital formation were revised slightly downwards and in the period 1993 to 1998 the average annual rate of increase was estimated at just below 7½ per cent instead of 7½ per cent as before (see Table 3). Growth rates of 3½ per cent in 1997 and 7½ per cent in 1998 were revised to 5 per cent and 4½ per cent, respectively.

Estimates of the value of growing forests were incorporated as work-in-progress in the calculation of changes in inventories. This, in addition to the incorporation of better quality statistics on the book value of inventories, resulted in net investment in inventories as a percentage of gross domestic product increasing from 1½ per cent in 1993 to 1998 to 3½ per cent.

Revisions of interest payments by general government

To meet the specifications of accrual base accounting, it was necessary to allow for the discount on issues of government stock to be distributed over the full maturity of the stock. The estimated annual values of the discount was added to government interest payments, thus increasing the debt servicing cost of government. Government saving declined as a result of this, but total saving in the economy was not affected.

Revision of taxes on production and imports

The income collected from taxes on imports on behalf of the other member countries of the Southern African Customs Union (SACU), including some transfer payments, was always treated as a negative tax income in the national accounts. To enhance consistency among the member countries of SACU, the amount exceeding the customs and excise payment in terms of the SACU agreement is now treated as a current transfer payment from South Africa to these countries. The total taxes on production and imports accordingly increased by the amount allocated to transfers and the gross domestic product at market prices increased. Current transfers to the rest of the world were increased by a similar amount, leaving national disposable income and saving for the economy unaffected.