

Note on the benchmark revisions and rebasing of South Africa's national accounts

by H Wagner¹

Introduction

In this issue of the *Quarterly Bulletin*, the South African Reserve Bank, in co-operation with Statistics South Africa, presents the results of the eighth comprehensive, or benchmark, revision of the national accounts for South Africa. The previous comprehensive revision was released in December 2004.

Traditionally, benchmark revisions of the national accounts differ from the annual national accounts revisions because of the scope of the changes and the number of years subject to revision. Comprehensive revisions to the national accounts were required in order to incorporate four major types of improvements: (1) changes in definitions and classifications to portray the evolving South African economy more accurately, (2) statistical changes to reflect the introduction of new and improved methodologies, and the incorporation of newly available and revised source data, (3) changes in presentation to reflect the changes in definitions and the statistical changes, and (4) to rebase the estimates at constant prices, moving the base period to a more recent year so that volume indicators are more reflective of the current structure of the economy.

Currently, the South African Reserve Bank (the Bank) and Statistics South Africa compile and disseminate the national accounts broadly according to the recommendations of the 1993 System of National Accounts (SNA), published by the United Nations in co-operation with other international organisations comprising the Organisation for Economic Co-operation and Development, the Statistical Office of the European Communities, the International Monetary Fund and the World Bank.

As economies and societies change over time, past conventions become inappropriate, methodological and theoretical developments take place, and users' needs change. The national accounts standards therefore require regular updating to ensure that the system does not become obsolete. A comprehensive update of the 1993 SNA was recently completed and volumes 1 and 2 of the 2008 SNA were released in August 2008 and February 2009 respectively. Reasons for changes to the 1993 SNA included the need to deal with economic issues that arose or became more prominent since the completion of the 1993 SNA more than 15 years ago, to remove inconsistencies in the 1993 SNA and to harmonise the 1993 SNA with other manuals in the field of macroeconomic statistics. The majority of new recommendations in the 2008 SNA relates to units and transactions that represent characteristics of an increasingly globalised economy, innovation in financial instruments, and greater interest in the wealth and debt of the private and public sectors. The new features and recommendations fall into four main groups, dealing with assets; the financial sector; globalisation and related issues; and the general government and public sector.

The extent to which countries will be able to introduce the recommendations of the 2008 SNA will mainly depend on the level of implementation of the 1993 SNA and country-specific research capacity. For South Africa, preliminary indications are that a strategy and action plan for the implementation of the 2008 SNA would be in place in the foreseeable future.

¹ The author wishes to express his sincere appreciation to J P van den Heever, M M Smal, J W Prinsloo and E Botes for their valuable contributions in preparing this note, and to N N Molemoeng, K Kuhn, R Willemse, S Motaung, S Knox, K P Muneri, T Morakile, J Ramatete and B Sampson for their sterling effort with statistical research and compilation.

The current revisions draw on information from all relevant source data released between 2004 and 2008. The Research Department of the Bank co-operated closely with Stats SA and the National Department of Agriculture during the completion of the revision process. The annual supply and use tables for 2002 to 2008, as compiled by Stats SA, were used extensively to reconcile the data and ensure consistency between the various aggregates as estimated through the independent calculations of the gross domestic product of South Africa according to the production, expenditure and income approaches.

Whereas the National Department of Agriculture was mainly responsible for estimating output and intermediate expenditure in the agricultural sector, Stats SA and the Bank jointly concentrated on estimating the overall gross domestic product at current and constant prices. Stats SA was responsible for the revisions related to the production and income approaches, while the Bank was responsible for the revision of the components of gross domestic expenditure as well as imports and exports of goods and services at current and constant prices, and for the compilation of a set of integrated production, distribution and accumulation accounts for the main institutional sectors in South Africa.

Volume measures and rebasing

The changes in the values of flows of goods and services stemmed from two components, one reflecting changes in the prices of the goods and services concerned and the other changes in their volumes. Consequently, national accounts data at constant prices are compiled to measure changes in the volume or quantity 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 effect 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 changes, 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 2005 instead of 2000 as the new base year.

The new constant price series, with 2005 as the base year, have been calculated for the period from 2003 onwards. This allows for changes in the growth rates on account of changes in the weighting structure, while ensuring that the weights used in the measurement of changes in real national accounts aggregates between 2000 and 2005 reflect reasonably closely the relevant price and quantity structure for this period.

The previously estimated series expressed in terms of constant 2000 prices have been retained for the period up to 2002 and have 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 2003 to accommodate the underlying revision for certain aggregates. This implies that in those cases, the growth rates at constant prices before 2003 could also change.

So as not to disturb the previously existing rates of change in volume series, up to 2002 subtotals and totals have been converted to 2005 prices independently of their components. As a result, these converted subtotals and totals for periods before 2003 are not equal to the sums of their components. This means that constant price figures do not “add up” in an accounting sense.

Relevant data sources, and changes to data and tables published in the *Quarterly Bulletin*

The new benchmark and related revisions of the gross domestic product and the components of gross expenditure at current prices used the statistical input that became available from various large sample surveys and other surveys, specific sectoral surveys and technical reports. Particularly important sources included the 2007 census of agriculture and the 2006 large-scale agricultural survey; the 2005/06 income and expenditure survey of households; the 2005 general household survey; the 2004/05 economic activity survey; the 2006, 2007 and 2008 annual financial surveys; and the 2006 electricity, gas and water supply report. In addition, large sample surveys of the following industries were also used: the 2004 survey of the mining industry; 2005 survey of the manufacturing industry; 2007 survey of the construction industry; 2005 survey of the wholesale and retail trade; 2004 and 2007 surveys of the accommodation industry; 2006 survey of transport, post and telecommunication; 2006 survey of real estate and business services; and 2004 survey of personal services.

In addition to revisions that stemmed from the more up-to-date source data mentioned above, the following methodology and technical changes related to the data and tables published in the *Quarterly Bulletin* were also implemented:

- Final expenditure per product by households on durable goods was expanded to show expenditure on privately owned computers and related equipment separately. In addition, households’ expenditure on security services was separately identified and explicitly estimated, and is now shown separately in expenditure on services, that is, an identified part of miscellaneous services.
- Gross fixed capital formation on machinery and equipment was disaggregated to show capital expenditure on computers and related equipment separately. Consequently, the classification of gross fixed capital formation by type of asset was brought in line with the recommendations of the 1993 SNA.
- The value added by the finance subsector was adjusted to include estimates of output by services auxiliary to financial intermediation, primarily brokers active in the bond and derivatives markets. This service was not explicitly included in previous estimates.
- Value added by the banking sector, particularly the component “other” income, was revised as more detail on income items became available following more comprehensive reporting by banks after the adoption of the Basel II guidelines.

- New price indices reflecting the results of the revision of the consumer and production price indices were used from 2002 for the deflation of nominal values. Furthermore, where appropriate, deflating of components of household consumption expenditure was introduced at a more disaggregated level, which enhanced the reliability of the series on real final consumption expenditure by households.
- The scope to estimate financial intermediation services indirectly measured (FISIM) was broadened with the incorporation of data on interest paid and received from the Land and Agricultural Bank of South Africa. In addition, the classification of FISIM paid and received by the institutional sectors and the distribution of FISIM to industries were refined, in keeping with revised data obtained from banks since the banking sectors' adoption of the Basel II guidelines.

Revision of gross domestic product

The nominal value of gross domestic product at market prices in the benchmark year 2005 was revised upwards by an amount of R32,1 billion or by 2,1 per cent and the contributions of the various economic subsectors to total gross value added at basic prices changed notably from 2000 to 2005 (see Table 1).

Table 1 Contribution of gross value added by kind of economic activity to total value added at basic prices

Per cent

Sectors	2000	2005
Primary sector	10,9	10,3
Agriculture, forestry and fishing	3,3	2,7
Mining and quarrying	7,6	7,6
Secondary sector	24,2	23,0
Manufacturing	19,0	18,2
Electricity, gas and water	2,7	2,4
Construction	2,5	2,4
Tertiary sector	64,9	66,7
Wholesale, retail and motor trade, catering and accommodation	14,6	13,9
Transport, storage and communication	9,6	9,7
Finance, insurance, real-estate and business services ...	18,6	21,9
General government	15,9	14,9
Other	6,1	6,3
Gross value added at basic prices	100,0	100,0

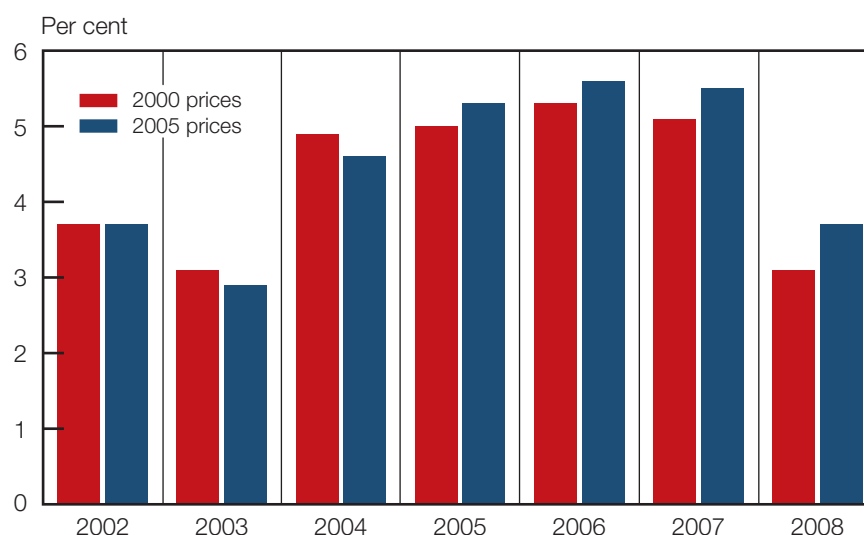
As shown in the table, the primary sector's contribution to nominal gross value added at basic prices declined from 10,8 per cent in 2000 to 10,3 per cent in 2005. This was due to a decline in the contribution of the agricultural sector, while the relative size of the mining sector remained unchanged at 7,6 per cent. The decline in value added by the agricultural sector in 2005 could partly be attributed to the fact that the net income came under pressure as the term of trade index for agriculture declined significantly in 2005. This was due to a reduction in producer prices, while input costs kept rising. In the case of the mining sector the relatively stable contribution to total value added at basic prices was mainly caused by the increase in value added by the platinum group metals industry, which almost offset the decline in value added by the gold-mining industry.

The secondary sector's share of total value added shrank from 24,2 per cent in 2000 to 23,0 per cent in 2005, reflecting relative declines in the contribution of value added by all three subsectors (i.e., manufacturing; the sector supplying electricity, gas and water; and the construction sector). The manufacturing sector's relative importance declined from 19,0 per cent in 2000 to 18,2 per cent in 2005. This decline implies that in 2005 manufacturing forfeited its status as the most important contributor to gross value added in the economy, to the finance, insurance, real-estate and business services sector. The weaker output of the manufacturing sector in 2005 can partly be ascribed to moderate growth in output prices, coupled with a strengthening in the exchange value of the rand which put manufacturers' export proceeds under pressure.

By contrast, the contribution of the tertiary sector to total value added at basic prices increased from 64,9 per cent in 2000 to 66,7 per cent in 2005. The main contributor to this change was the finance, insurance, real-estate and business services sector, as its share in gross value added rose from 16,6 per cent in 2002 to 21,9 per cent in 2005. This increase stemmed mainly from higher levels of output recorded by the finance, insurance, real-estate and business services sector. These developments reflected the positive impact of an increase in real personal disposable income and a rising number of wealthy middle-class citizens with an increasing demand on business services, the drive to reduce the unbanked portion of the South African population as well as the property boom that boosted the value added by the real-estate subsector.

Growth in the revised estimates of real gross domestic product for 2002 and subsequent years deviates somewhat from the previously published growth rates.

Growth in real gross domestic product at market prices



Growth in real gross domestic product was revised downwards in 2003 and 2004, but from 2005 the annual growth was revised upwards by an average of half-a-percentage point per year. This increased the average real annual growth rate for the period 2002 to 2008 to 4,6 per cent at 2005 prices, from 4,4 per cent at 2000 prices.

Compound annual rates of growth in the primary sectors was revised downwards from 1,0 per cent to 0,5 per cent for the period 2002 to 2008. The compound growth for both the agricultural and mining sectors was revised downwards.

The average annual growth rate in the secondary sector was revised upwards to 4,7 per cent, compared with the growth rate of 4,2 per cent registered in the corresponding period prior to the revisions. Stronger average growth in the manufacturing sector and the sector supplying electricity, gas and water more than neutralised lower growth recorded in the construction sector. The last-mentioned moderation stemmed from a revised methodology and new weights used in the calculation of real value added by the construction sector.

Table 2 Percentage change in gross value added by kind of economic activity, 2002 to 2008

Per cent

Sectors	Compound annual rates at 2000 prices	Compound annual rates at 2005 prices
Primary sector	1,0	0,5
Agriculture, forestry and fishing	2,9	2,1
Mining and quarrying	0,1	-0,1
Secondary sector	4,2	4,7
Manufacturing	3,1	3,9
Electricity, gas and water	1,9	3,8
Construction	12,4	10,4
Tertiary sector	5,0	6,0
Wholesale, retail and motor trade, catering and accommodation	5,4	4,6
Transport, storage and communication	5,3	5,3
Finance, insurance, real-estate and business services	6,0	7,1
General government	3,2	3,4
Personal services	3,6	4,2
Gross value added at market prices	4,4	4,6

The average growth for the tertiary sector was revised upwards from 5,0 per in 2002 to 2008 to 6,0 per cent. This was due to a strong increase in the growth rate of real value added by the finance and business services sector, supported by increases in the growth rates of the sectors providing personal services and general government services. By contrast, the compound annual growth rate in the trade sector decreased, while the growth in the transport and communication sector remained unchanged between 2002 and 2008.

Revisions of the components of gross domestic expenditure

Aggregate final consumption expenditure contributed 82,4 per cent to gross domestic product in the 2005 base year, compared to 81,1 per cent in 2000. This increase was due to higher contributions by final consumption expenditure by households and by general government (see Table 3).

Likewise the contribution of gross capital formation rose from 15,9 per cent in 2000 to 18,1 per cent in 2005, reflecting increases in both fixed capital formation and the change in inventories relative to total gross domestic product.

By contrast, the contribution of exports of goods and services to gross domestic product declined slightly from 27,9 per cent in 2000 to 27,4 per cent in 2005. However,

imports of goods and services rose from 24,9 per cent to 27,9 per cent in the corresponding period. This increase in imports in the base year mainly resulted from the strengthening of the exchange value of the rand and the increase in the consumption and investment demand of the South African economy in the advanced stages of the 1999 to 2007 upward phase of the business cycle.

Table 3 The contributions of the components of gross domestic expenditure to gross domestic product at market prices

Per cent

Components	2000	2005
Final consumption expenditure.....	81,1	82,4
Households.....	63,0	63,3
General government.....	18,1	19,1
Gross capital formation	15,9	18,1
Fixed capital formation	15,1	16,8
Change in inventories	0,8	1,3
Gross domestic expenditure.....	97,0	100,5
Exports of goods and services	27,9	27,4
Imports of goods and services	-24,9	-27,9
Gross domestic product at market prices.....	100,0	100,0

Revisions of the components of gross domestic expenditure were benchmarked individually in accordance with the relevant sources mentioned. The revised estimates of consumption expenditure by households were based on data obtained from

- the 2005/06 Income and Expenditure Survey of Households and the 2005 General Household Survey, both conducted by Stats SA;
- a study by the Bureau for Market Research at the University of South Africa, namely *Total Household Expenditure in South Africa by Province, Population Group and Product, 2005*; and
- the findings of special research projects such as those for the security industry, the imputed rent for owner-occupied dwellings and expenditure on narcotics and personal care services, including service provided by sex workers.

Although final consumption expenditure by households as a percentage of gross domestic product increased only slightly from 63,0 per cent in 2000 to 63,1 per cent in 2005, within aggregate consumption expenditure there were significant shifts between components. Final expenditure on durable goods relative to total final expenditure increased from 8,6 per cent in 2000 to 10,4 per cent in 2005. This increase was primarily driven by the surge in outlays on new motor vehicles. Final expenditure on semi-durable goods relative to total expenditure by households declined from 9,8 per cent in 2000 to 9,4 per cent in 2005 due to lower outlays on clothing and footwear. The share of non-durable goods declined from 39,2 per cent to 38,1 per cent, brought about by relatively lower outlays mainly on food, beverages and tobacco. Expenditure on services relative to total expenditure declined from 42,4 per cent to 42,0 per cent. Relatively stronger increases in expenditure on rent and communication services were more than neutralised by declines in expenditure on domestic services, medical services and miscellaneous services.

Final consumption expenditure by general government was revised in accordance with changes made by the Public Finance Division of the Research Department as obtained

from financial reports released by the Auditor-General from 2002/03 onwards. In addition, up-to-date information on national, provincial and local government as published by Stats SA was also incorporated.

Estimates of final consumption expenditure by general government as a ratio of gross domestic product rose from 18,1 per cent in 2000 to 19,5 per cent in 2005 as government expenditure on goods and services, and on salaries and wages rose relative to total gross domestic product. These increases were mainly the result of substantial outlays related to the defence procurement programme on destructive military equipment and the gradual increase in the employment levels of general government between 2000 and 2005.

Revisions to gross fixed capital formation and the book value of inventories were based on the data obtained from the large sample surveys for the different industries in the base year, while the Stats SA *Annual Financial Surveys* for the appropriate industries were used for the other years.

Gross fixed capital formation as a percentage of gross domestic product increased from 15,1 per cent in 2000 to 16,8 per cent in 2005. Rising capital formation by the private sector and public corporations more than offset the subdued performance of investment expenditure by general government on new infrastructure developments between the two base year periods. The last-mentioned type of capital expenditure was especially held back at the local authority level. In the private sector the contribution to fixed capital formation was boosted by capital outlays made by the sector commerce, transport and communication and the financial services sector. In the case of public corporations, increases in gross fixed capital formation stemmed mainly from the sector supplying electricity, gas and water, transport and the subsector communication.

Although compound annual growth in aggregate real gross domestic expenditure remained unchanged at 6,2 per cent for the period 2002 to 2008, the growth rates registered by the components of gross domestic expenditure changed markedly.

Estimates of real final consumption expenditure by households and general government were revised slightly downwards and in the period 2002 to 2008 the average annual growth in real outlays on final consumption expenditure by households declined from 5,7 per cent to 5,2 per cent. Likewise, in the case of general government the average annual growth in real final consumption expenditure declined from 5,4 per cent to 5,2 per cent.

Real outlays on gross fixed capital formation were revised substantially upwards and in the period 2002 to 2008 the average annual rate of increase rose from 11,3 per cent to 12,1 per cent. The annual growth in real capital expenditure was revised higher in all the years from 2002 to 2008 except in 2006. The average annual growth for real exports and imports of goods and services remained virtually unchanged.

Table 4 Average real growth: Components of gross domestic expenditure and gross domestic product aggregates, 2002 to 2008

Per cent

Components	Compound annual rates at 2000 prices	Compound annual rates at 2005 prices
Final consumption expenditure by households	5,7	5,2
Final consumption expenditure by general government	5,4	5,2
Gross fixed capital formation	11,3	12,1
Gross domestic expenditure	6,2	6,2
Exports of goods and services	4,3	4,3
Imports of goods and services	10,6	10,5
Expenditure on gross domestic product		
GDP(E) at market prices	4,7	4,5
GDP(P) at market prices	4,4	4,6
GDP(I) at market prices	4,6	4,6
GDP(A) at market prices	4,6	4,6

GDP(E) is gross domestic product estimated from the expenditure components

GDP(P) is gross domestic product estimated from the production base

GDP(I) is gross domestic product estimated from the income components

GDP(A) is the average measure of GDP(E), GDP(P) and GDP(I)

Revision of gross saving

Changes to the level of gross saving was made in response to new benchmarked data on output, intermediate consumption and compensation of employees. The primary and secondary income levels (i.e., property income, social contributions and benefits, current taxes on income and wealth and current transfers for all institutional sectors) were also revised according to more complete data sources. The main sources to benchmark non-financial corporation were the *Annual Financial Surveys* of various industries published by Stats SA, while the financial sector's revisions were based on data obtained from the consolidated income statements of the banking sector and up-to-date information from the surveys conducted by the Capital Market and Flow of Funds Division of the Research Department. The McGregor BFA database, the various exchanges and the general government financial statistics provided additional inputs.

Gross saving as a percentage of gross domestic product declined from 15,8 per cent in 2000 to a new benchmarked ratio of 14,5 per cent in 2005. However, this is slightly higher than the original estimate for 2005, namely 14,3 per cent. This improvement was due to the general government's gross saving ratio that increased from 1,1 per cent in 2005 to 1,5 per cent after benchmarking. Households' gross saving ratio deteriorated from 1,8 per cent to 1,7 per cent, while the saving ratio of the corporate sector remained at 11,3 per cent.

Table 5 Gross saving as a percentage of gross domestic product

Sector	2000	2005	
		Before revision	After revision
Household saving	2,5	1,8	1,7
Corporate saving	13,4	11,3	11,3
Non-financial corporate sector	10,7	9,5	9,3
Financial corporate sector	2,7	1,8	2,0
General government	-0,2	1,1	1,5
Total saving	15,8	14,3	14,5

Conclusion

The compilation of a country's national accounts involves a continuous examination of existing data sources and the development of new information sources. The recognition and capturing of new developments in technology and products, and the changed behaviour of consumers and businesses, together with improved and new methodologies of compiling a set of national accounts as proposed by international guidelines, formed the basis of this set of national accounts portraying a slightly evolved structure of the South African economy. This should lead to improved and more relevant macroeconomic analyses.

The data contained in the statistical tables of the *Quarterly Bulletin* include the official estimates of South Africa's national accounts benchmarked according to the latest and most comprehensive data sources available and rebased to 2005 prices. Along with the supply and use tables, and the flow of funds accounts, they present a reliable and comprehensive statistical overview of the South African economy.