

Note on the benchmark revisions and rebasing of South Africa's national accounts statistics^{1, 2}

by E Botes and K Kuhn³

Introduction

The results of the comprehensive benchmarking and rebasing of South Africa's national accounts statistics, jointly undertaken by Statistics South Africa (Stats SA) and the South African Reserve Bank (SARB), were published by Stats SA on 25 August 2021 and have been incorporated in this edition of the *Quarterly Bulletin*. This *Quarterly Bulletin* and the SARB website include the revised statistics from the first quarter of 1993 to the second quarter of 2021 for most of the time series.⁴ As indicated in the SARB media release of 26 August 2021, the revised statistics from 1946 to the fourth quarter of 1992 will be available on the SARB website on 15 December 2021 with the release of the December 2021 edition of the *Quarterly Bulletin*, following the backward linking of the timeseries. In addition, a dedicated supplement containing all the revised statistics as well as a discussion on the conceptual, methodological, classification and source data changes will be published on 15 February 2022.

The main highlight of the revised national accounts statistics relates to the upward revision of the nominal gross domestic product (GDP) by 11% in 2020 and a higher level of 9.6%, on average, between 2011 and 2020. This increase in nominal GDP will lower the ratios of economic aggregates such as the fiscal deficit and debt to GDP by about a tenth. Estimated real GDP growth rates did not change materially, with the average growth rate between 2010 and 2020 increased marginally from 0.6% at 2010 prices to 0.7% at 2015 prices. Nominal gross value added (GVA) in 2015 showed a pronounced upward revision in the level of the finance, real estate and business services as well as the personal services sectors, while that of general government services and mining were revised lower. The contribution of the finance, insurance, real estate and other business services sector increased significantly to 24.3% of GDP in 2020, from the earlier estimate of 19.9%. The reclassification of various health and education services, from government to personal services, lowered the estimated contribution to GDP by government significantly from 19.4% to 9.2%, while that of personal services increased markedly from 6.0% to 17.3%. Furthermore, the revisions revealed a more consumption-driven economy, with most of the increase in GDP emanating from household consumption expenditure. The contribution of household spending to nominal GDP in 2020 increased from 60.0% to 62.3%, while that of fixed investment spending decreased from 15.8% to 13.7%.

This review and update of the estimates of the size, structure and performance of the economy differ substantially from regular annual revisions in terms of the scope of the changes and the length of the period being revised, while also incorporating new international best practices.

The revised national accounts statistics mainly reflect:

- improvements of, and revisions to, basic economic datasets as part of Stats SA's strategy to continually improve economic statistics;
- new internal and external source data, inclusive of the results of intermittent structural industry surveys;
- methodological improvements; and
- a change in the base year from 2010 to 2015 for the national accounts estimates at constant prices.

This note gives an overview of benchmarking and rebasing practices, new source data applied, methodological improvements as well as the revision of the GDP and the components of the gross domestic expenditure (GDE).

1 For more detail on the methodology used by Stats SA, see <http://www.statssa.gov.za/publications/Report%2004-04-04/Report%2004-04-042021.pdf>

2 Double deflation was applied during benchmarking to derive the volume estimates of output and intermediate consumption, as recommended in the *System of National Accounts 2008*. Consequently, the constant-price value added was calculated by subtracting the constant-price intermediate consumption from constant-price output. This ensures greater coherence in the national accounts, where real gross domestic product (GDP) growth from the expenditure side should equal real GDP growth from the production side. See <https://unstats.un.org/unsd/nationalaccount/docs/sna2008.pdf>

3 The authors would like to thank the staff of the National Accounts Unit in the Economic Statistics Department for their valuable contribution to the benchmarking and rebasing of South Africa's national accounts statistics.

4 Due to the proximity of the release of this edition of the *Quarterly Bulletin* to the Stats SA releases and the extent of the further revisions required to the additional SARB national accounts statistics, some historical statistics on the SARB website will only be available as from the first quarter of 2010. On 21 October 2021, these time series will be available on the SARB website as from the first quarter of 1993.



Benchmarking and rebasing

The concept of benchmarking relates to the adoption of new and additional high-frequency data sources that track short-term developments in an economy in the base year (2015 in this instance). These are then reconciled with more accurate and detailed data that are less frequently published to determine revised nominal levels in the base year, on which future estimates will be based.

Rebasing replaces the reference year for the real, or constant price, estimates of national accounts aggregates with a new and more recent base year to provide for changes in relative prices. The base year typically has to be a 'normal' year in the economy for which the required data are readily available.

National accounts statistics at constant prices reflect changes in the volume, or quantity, of goods and services produced or utilised. Volume changes in a macroeconomic aggregate between a chosen base period and the current period are measured by revaluing the aggregate in the current period at the prices that prevailed in the base period, and then calculating the change between these two periods. This eliminates the effects of price changes from the base period to the current period by recalculating the value of the aggregate in terms of the prices of goods and services in the base period. The prices in the selected base period are a factor in determining the real values of the different goods and services in other periods.

Relative values change over time as prices generally do not change at the same pace from one period to another. Shifts in relative prices may be brought about by changes in supply and demand that, in turn, reflect factors such as different rates of change in productivity in different industries, changes in the quality of products, technological advances, tax changes, international price movements, exchange-rate adjustments, and changes in tastes and preferences. 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 must be changed at regular intervals.

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 the revised statistics primarily reflects the difference in the unit of measurement. For example, rebasing from 2010 prices to 2015 prices increased the level of real GDP, essentially reflecting the increase in the level of prices from 2010 to 2015. It does not indicate an increase of the same magnitude in the output or expenditure volumes.

The new constant price statistics, with 2015 as the base year, have been recalculated from 2010 onwards. This allows for changes in the growth rates on account of changes in the weighting structure (as a result of adjustments to the nominal statistics as deflated by new or re-indexed deflators), while at the same time ensuring that the weights used in the measurement of changes in real national accounts aggregates between 2010 and 2020 reflect the relevant new price and quantity structure for this period reasonably closely. The previously estimated time series, expressed in terms of constant 2010 prices, have been retained for the period up to 2010 and were linked to the new time series without being reweighted. However, due to the magnitude of some revisions, it was necessary to allow for a gradual phasing-in period prior to 2006 to accommodate the underlying revisions to certain aggregates. This implies that the growth rates at constant prices before 2006 could change accordingly in those cases.

In order not to disturb the previously identified growth patterns in volume statistics up to 2009, subtotals and totals up to 2009 were converted to 2015 prices independently of their components. Consequently, these converted subtotals and totals for the period before 2009 are not equal to the sum of their components. This implies that the constant price statistics do not add up in an accounting sense, with the difference being reflected in the residual.





New source data and methodological improvements

The benchmark revisions are based on relevant statistics released by Stats SA during the period 2013 to 2018 as well as some new external data sources. The most notable new sources are the 2014/15 *Living Conditions Survey*, the 2017 *Census of Commercial Agriculture* and various issues of the *Annual Financial Statistics (AFS) survey*, the *General Household Survey*, the *Quarterly Financial Statistics of Municipalities* and the annual *Structural Industry Surveys (SIS)* for the different industries that were conducted in a cycle of three to five years.

Methodological improvements in the estimation of the GDP by industry as well as the different expenditure components reflect a review of the classification of both industries and commodities, based on stakeholder requirements and a closer link to the *AFS survey* and the *SIS*. These methodological changes include:

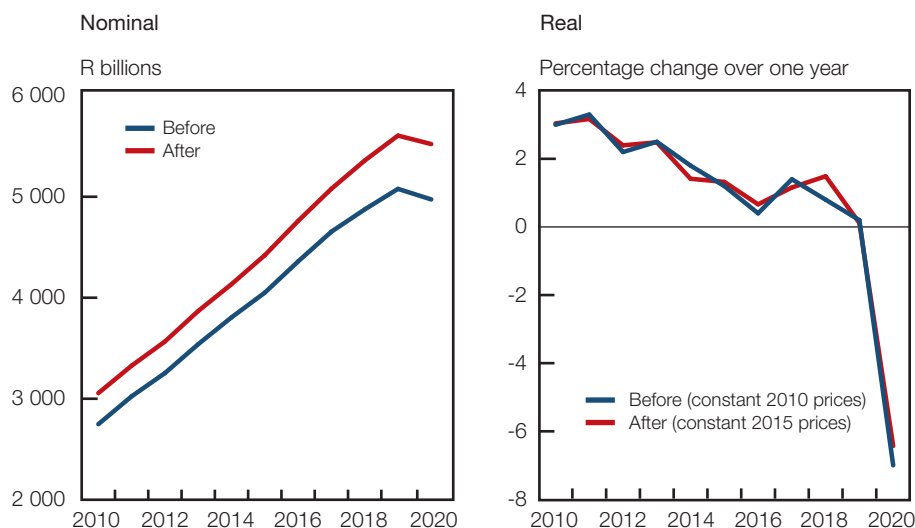
- new industry and product classification;
- a new supply and use table (SUT) framework;
- the reclassification of general government data by industry;
- improved trade services estimates;
- the addition of own-account activities by industry;
- refined methods for calendarisation, for calculating taxes on products as well as for trade and transport margins;
- improved estimates for financial services indirectly measured (FISIM); and
- a change from the straight-line to the geometric method for calculating the consumption of fixed capital.

Within the context of the new SUT framework, these tables were recompiled for the period 2013 to 2018 and were back-casted and linked to 1993, starting in 2012 for most of the production-based estimates and in 2009 for most of the expenditure-based estimates.

Revision to gross domestic product

The outcome of the benchmark revisions and rebasing exercise increased the level of nominal GDP, or GDP at current prices, by 9.2% in 2015. The difference between the revised and previous level of nominal GDP averaged 9.6% between 2011 and 2020, ranging from 8.6% in 2014 to 11.0% in 2020. The annual growth rates in real GDP before and after the revisions are similar, both in magnitude and progression, with the average growth rate between 2011 and 2020 edged higher from 0.7% before the revisions to 0.8% after the revisions. The largest deviation was in 2018, with annual increases still recorded for the period 2011 to 2019, while the initially estimated national lockdown-induced contraction of 7.0% in 2020 was revised lower to 6.4%.

Figure 1 Gross domestic product



Source: Stats SA



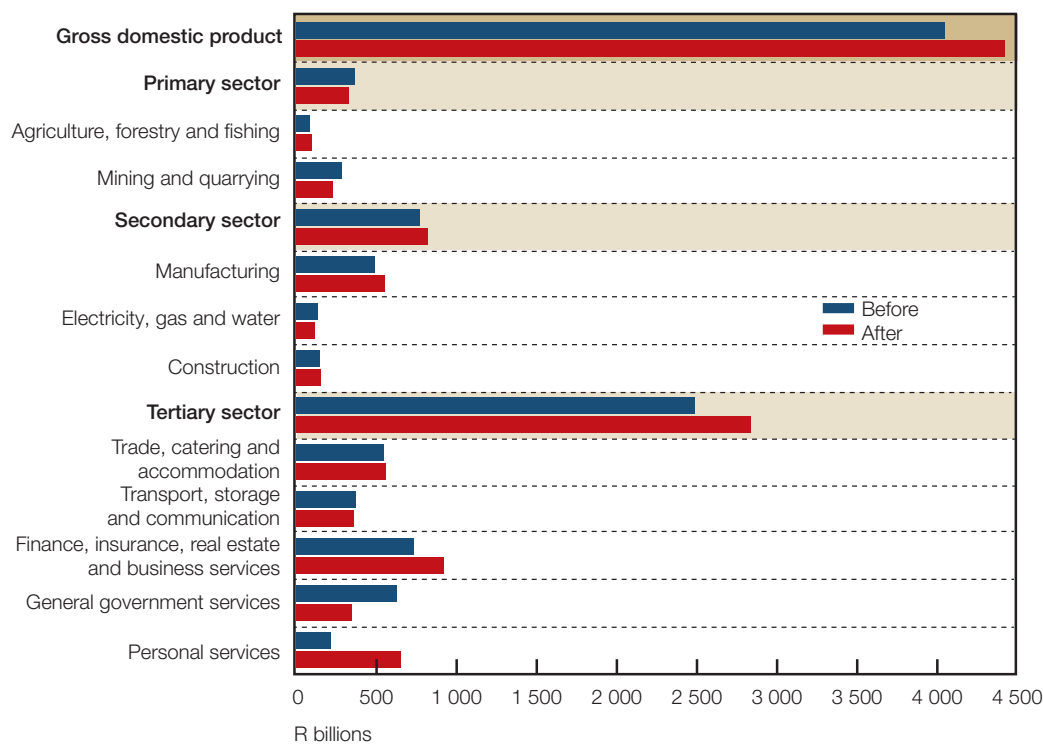
Table 1 Comparison of gross domestic product before and after benchmark revisions and rebasing

	Level of nominal gross domestic product				Growth in real gross domestic product		
	Current (R billions)			Percentage change	Percentage		Percentage points
	Before	After	Difference	Difference	Before (constant 2010 prices)	After (constant 2015 prices)	Difference
2011.....	3 024	3 327	303	10.0	3.3	3.2	-0.1
2012.....	3 254	3 566	313	9.6	2.2	2.4	0.2
2013.....	3 540	3 869	329	9.3	2.5	2.5	0.0
2014.....	3 805	4 134	329	8.6	1.8	1.4	-0.4
2015.....	4 050	4 421	371	9.2	1.2	1.3	0.1
2016.....	4 359	4 760	400	9.2	0.4	0.7	0.3
2017.....	4 654	5 078	425	9.1	1.4	1.2	-0.2
2018.....	4 874	5 358	484	9.9	0.8	1.5	0.7
2019.....	5 078	5 605	527	10.4	0.2	0.1	-0.1
2020.....	4 973	5 521	548	11.0	-7.0	-6.4	0.6

Source: Stats SA

A comparison of nominal GVA in 2015, before and after the revisions, shows that the increase in the level was most pronounced in the finance, real estate and business services and in the personal services sectors, along with a smaller increase in manufacturing. The level of nominal GVA was revised lower in the general government services and mining sectors.

Figure 2 Components of nominal gross value added in 2015



Source: Stats SA

5 This relates to the inclusion of unclassified businesses that were active on the business register but were previously not included in the *AFS survey*, which covers the formal business sector and is conducted by Stats SA.

In the finance, insurance, real estate and business services sector, the size of business services increased due to the application of new source data, while real estate estimates were aligned with the revised estimates on rent in the final consumption expenditure by households. This followed an improvement in the methodology for compiling owner-occupied housing estimates in real estate activities. Separate estimates were compiled for owner-occupied dwellings and dwellings rented out by unincorporated enterprises, using information from household final consumption expenditure. Improvements in the coverage of computer and related services and an increase in 'other' business activities due to an expanded coverage of the economy⁵ supported the increase in business services.

The significant downward revision in the GVA by the general government services sector is closely linked to the substantial upward revision in the other personal services sector. Education and health activities, previously classified as government services, have been reclassified as personal services because of a methodological change, in line with the *System of National Accounts 2008 (2008 SNA)*. In addition, education now includes new estimates for private education (based on household final consumption expenditure); sewage and refuse disposal and sanitation now includes local trading entities; recreational, cultural and sporting activities now include municipal sport, recreation and environmental protection activities, with the latter derived from Stats SA's *Quarterly Financial Statistics of Municipalities*.

Improved estimates of the non-observed economy were also included. Between 2013 and 2018, the non-observed economy accounted for, on average, 8% of total GVA.

Table 2 Contributions to gross value added and growth in real gross domestic product

Per cent

Sectors	Contributions of nominal gross value added by kind of economic activity to total value added at basic prices		Growth in real gross domestic product by kind of economic activity between 2010 and 2020	
	Before	After	Compounded annual growth rates	
	2010	2015	2010 prices	2015 prices
Primary sector	11.9	8.2	-0.6	0.3
Agriculture, forestry and fishing.....	2.6	2.5	1.8	3.4
Mining and quarrying	9.2	5.7	-1.4	-1.2
Secondary sector	20.9	20.6	-0.8	-1.1
Manufacturing.....	14.4	13.9	-0.6	-0.7
Electricity, gas and water.....	2.7	2.9	-1.0	-1.7
Construction.....	3.8	3.9	-1.4	-2.1
Tertiary sector.....	67.2	71.2	1.3	1.4
Trade, catering and accommodation	14.9	14.0	0.6	0.0
Transport, storage and communication.....	9.2	9.0	0.1	0.1
Finance, insurance, real estate and business services	21.0	23.2	1.8	2.4
Government services.....	16.2	8.7	1.9	2.3
Other personal services	6.0	16.4	1.3	1.1
Total	100.0	100.0	0.6	0.7

Source: Stats SA

When comparing the contribution of the various sectors to total nominal GVA at basic prices in the 2010 and 2015 benchmark years, that of the *primary sector* decreased from 11.9% to 8.2%, mainly due to the smaller mining sector. The compilation and estimation of the mining and quarrying sector's economic activity is now more reflective of an establishment basis, as recommended in the *2008 SNA*.



The contribution of the *secondary sector* shrank marginally from 20.9% to 20.6% between the 2010 and 2015 benchmark years, mainly due to the smaller contribution of the manufacturing sector as trade activities in this sector were re-allocated to the relevant trade services.

The increased contribution of the *tertiary sector* was driven by the higher contributions of both the finance, insurance, real estate and business services as well as the other personal services sectors, which more than offset smaller contributions by the transport, storage and communication services; the government services; and the trade, catering and accommodation services sectors.

The average annual growth rate in real GDP between 2010 and 2020 increased marginally to 0.7% at 2015 prices, from 0.6% at 2010 prices. Following the revisions, the real GVA by the primary sector, at constant 2015 prices, increased by 0.3%, on average, between 2010 and 2020. This compares to an average annual decline of 0.6% at constant 2010 prices. The annual average contraction in the real GVA by the secondary sector increased from 0.8% at 2010 prices to 1.1% at 2015 prices, while average growth in the tertiary sector accelerated marginally from 1.3% to 1.4% over this period.

Revision of the components of gross domestic expenditure

On the expenditure side, the most significant revision was the increase of 16.3% in the level of nominal final consumption expenditure by households in the 2015 benchmark year. By contrast, the nominal level of government final consumption expenditure increased only marginally, by 1.3%, while the level of gross fixed capital formation decreased by 3.2%. For households, increased expenditure on recreation and culture, restaurants and hotels, as well as on miscellaneous goods and services contributed the most to the upward revision, and originated from the following:

- A significant addition to the sale of alcoholic beverages by shebeens and taverns as well as an adjustment to include value added tax (VAT) affected restaurants and hotels.
- Census data on dwelling numbers by type of dwelling, nature of occupancy, and average rents increased actual and imputed dwelling rent.
- The SARB's estimates for life insurance, FISIM, financial services and insurance service charges were revised higher.
- Data from the Council for Medical Schemes, including an allowance for out-of-pocket expenses and pharmaceutical products, increased the estimates of medical and hospital services.
- Academic research on informal taxis increased the estimates of road transport fares.
- Estimates for tuition and boarding fees for private universities affected education estimates.

Table 3 Comparison of gross domestic expenditure components before and after benchmark revisions and rebasing in 2015

Components	Current (R billions)			Percentage change
	Nominal level			Difference
	Before	After	Difference	
Final consumption expenditure				
Households.....	2 420	2 815	395	16.3
General government.....	828	839	11	1.3
Gross fixed capital formation	823	796	-26	-3.2
Change in inventories	25	28	3	12.3
Residual	7	0	-7	
Gross domestic expenditure	4 103	4 478	375	9.1
Exports of goods and services.....	1 221	1 225	4	0.3
Imports of goods and services.....	1 274	1 283	8	0.7
Gross domestic product	4 050	4 421	371	9.2

Source Stats SA



The change in inventories, although very small in nominal terms, increased by 12.3% in 2015 following the revisions. The level of the nominal exports and imports of goods and services increased only marginally, by 0.3% and 0.7% respectively.

Figure 3 Components of expenditure on nominal gross domestic product in 2015

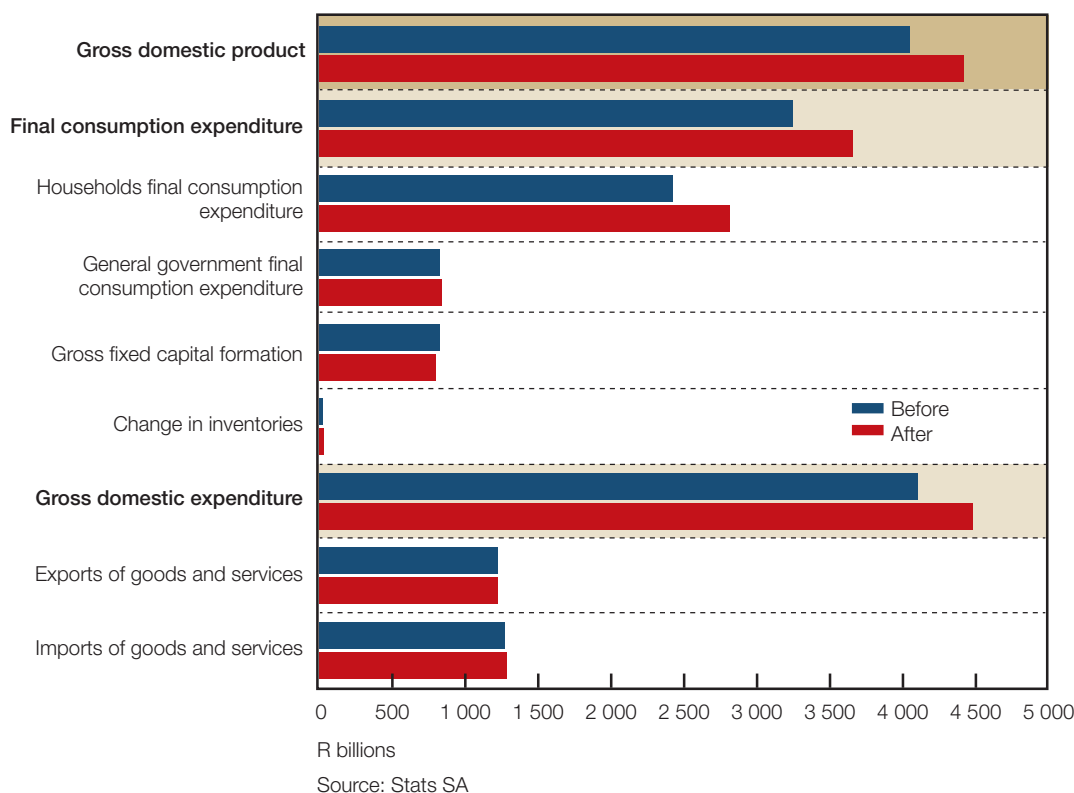


Table 4 Contribution of expenditure components to nominal gross domestic product and growth in real gross domestic expenditure

Per cent

	Contribution of nominal expenditure components to total nominal gross domestic product*		Growth in components of real gross domestic expenditure between 2010 and 2020	
	Before	After	Compounded annual growth rates	
	2010	2015	2010 prices	2015 prices
Final consumption expenditure				
Households.....	59.0	63.7	1.3	1.1
General government.....	20.2	19.0	1.6	2.0
Gross fixed capital formation	19.3	18.0	-0.6	-1.1
Change in inventories	0.2	0.6		
Gross domestic expenditure	98.8	101.3	0.7	0.8
Exports of goods and services.....	28.6	27.7	0.3	0.1
Imports of goods and services.....	27.4	29.0	0.7	0.5
Gross domestic product	100.0	100.0	0.6	0.7

* Totals may not add up due to rounding off.

Source: Stats SA

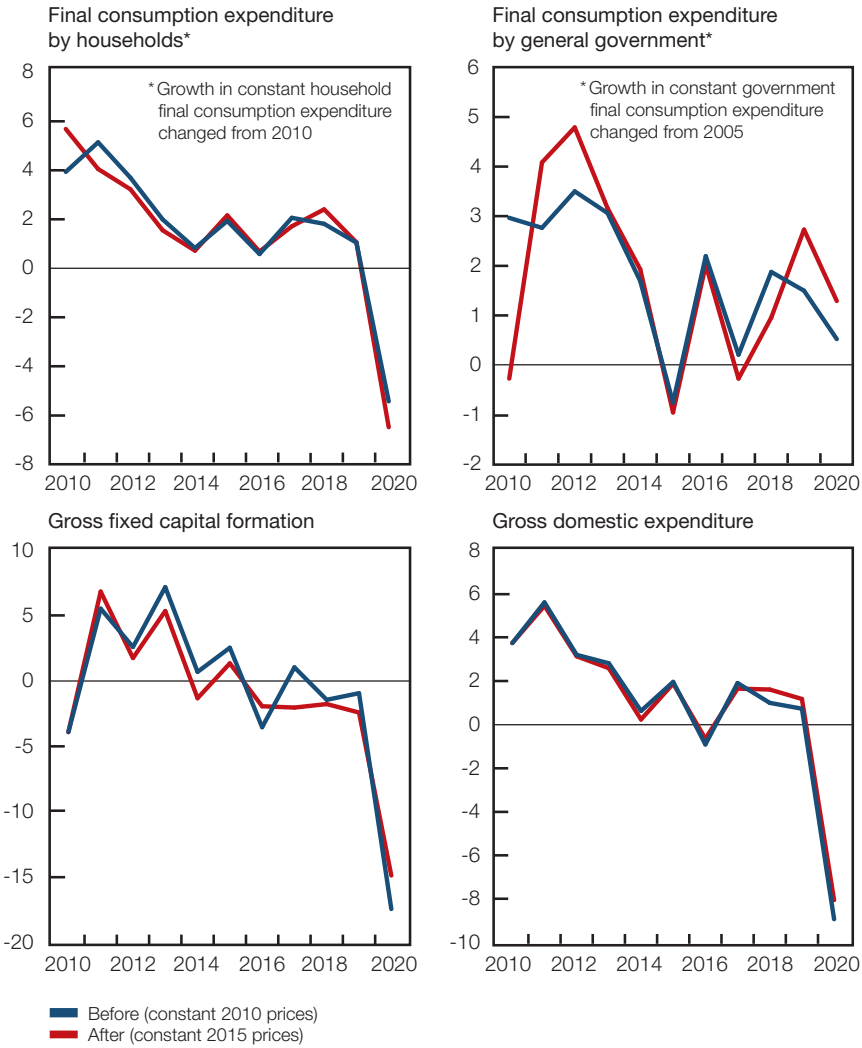
The magnitude of the revisions of all the subcategories of nominal and real final consumption expenditure by households varied from insignificant to substantial. Consequently, the contribution of final consumption expenditure by households to total nominal GDP increased from 59.0% in the 2010 benchmark year to 63.7% in the 2015 benchmark year. Nonetheless, the average annual rate of growth in the real final consumption expenditure by households between 2010 and 2020 was revised lower, from 1.3% at 2010 prices to 1.1% at 2015 prices.

Nominal final consumption expenditure by general government as a percentage of total GDP decreased from 20.2% in the 2010 base year to 19.0% in the 2015 base year. However, the average rate of growth in the real final consumption expenditure by general government between 2010 and 2020 was revised higher, from 1.6% at 2010 prices to 2.0% at 2015 prices.

Nominal gross fixed capital formation decreased from 19.3% of GDP in the 2010 base year to 18.0% in the 2015 base year. The average annual rate of contraction in real gross fixed capital formation between 2010 and 2020 almost doubled, from 0.6% at 2010 prices to 1.1% at 2015 prices.

Consistent with the GDP outcomes, the growth rates in the real expenditure components before and after the revisions are similar, both in magnitude and progression. Annual increases in the real final consumption expenditure by households were still recorded for the period 2010 to 2019, while the initially estimated national lockdown-induced contraction of 5.4% in 2020 was revised to 6.5%. The revised real final consumption expenditure by general government contracted in three of the years during the period 2010 to 2019, but the increase of 0.5% in 2020 was revised higher to 1.3%. For gross fixed capital formation, the revisions indicated five consecutive annual contractions from 2016 to 2020, while the decline of 17.5% in 2020 was revised to a smaller contraction of 14.9%.

Figure 4 Selected components of real gross domestic expenditure
Percentage change over one year



Source: Stats SA

