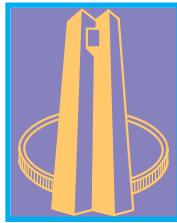# Article: Quarterly Bulletin

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South African Reserve Bank

An indicator of South Africa's external competitiveness

by S.S. Walters and B.C. de Beer

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1. Introduction

A country's international competitiveness is an important determinant of the expansion of exports and the containment of imports, and therefore of the promotion of economic growth. The concept of international competitiveness, however, is multidimensional and cannot easily be captured adequately in a single indicator at a macroeconomic level. Nevertheless, real effective exchange rates (REERs), i.e. nominal effective exchange rates adjusted for price differentials between a country and its trading partners, if properly constructed, can give a fair indication of relative price competitiveness in international trade, and are widely used for this purpose.

Changes in South Africa's international trading relationships after 1994, large-scale trade liberalisation and innovations in international financial markets, together with the establishment of the European Economic and Monetary Union in January 1999, have necessitated adjustments to the compilation of the country's nominal and real effective exchange rate indices. This study focuses mainly on the construction of a reliable and timely indicator of South Africa's external competitiveness, without dwelling on the causes or consequences of changes in competitiveness.

2. General considerations

International competitiveness may be defined as the relative price of foreign versus domestic tradeable goods (predominantly manufactured goods). A country's competitiveness improves as the relative price of its tradeable goods declines. In measuring such relative prices it is implicitly assumed that foreign and domestic tradeable goods are imperfect substitutes and that adjustment towards a long-run equilibrium value takes time because of market imperfections. If traded goods were perfect substitutes and adjustment was instantaneous, purchasing power parity would hold at all times and competitiveness indicators, if measured correctly, would show no variation over time. While manufactured goods are treated as differentiated products, it is assumed that primary commodities (products) are homogeneous and the law of one price consequently holds much more closely for them.

International competitiveness may be a useful indicator of economic performance, but is not, in itself, sufficient to assess the appropriate level of a country's exchange rate. A deterioration in competitiveness, i.e. a real appreciation of the domestic currency, could reflect, among other possibilities, an increased demand for domestic goods relative to foreign goods and hence, an improvement in the terms of trade, or an overvaluation of the domestic currency. Firm conclusions would not be possible without further information about the structure of the economy and/or the nature of external shocks to the economy. When analysing REERs, analysts and policy makers therefore have to differentiate between the "new" developments in the competitive position of a country and the changes that occurred as a result of the country's longer-term response to competitive developments in preceding years.

3. An ideal indicator: Theoretical considerations

Ideally, an indicator of price-related or cost-related competitive conditions in international trade should satisfy three basic conditions, namely:

- It should relate to those sectors of the economy which face international competition, and hence include all internationally traded goods;
- it should comprehensively reflect the price or cost conditions in these sectors; and
- it should be based on internationally comparable statistics.

Four primary issues which should also be considered when constructing external competitive indicators are the base period, the sample of foreign countries/currencies to be included, the choice of appropriate domestic and foreign price measures and the system for weighting the index. Each of these issues will be discussed briefly.

3.1 Base period

An appropriate base period should preferably be fairly recent, characterised by relative stability in the country's economy and low volatility in the domestic market for foreign exchange. At the same time, the base period should take into account the underlying "sustainable" direction of trade as well as any other changes that could exercise a significant impact on the future structure of the country's trade performance.

In cases where base periods are frequently revised, policy makers have to differentiate clearly between changes in the real exchange rate due to changes in underlying weights and changes in the underlying prices of traded goods.

3.2 Country coverage

In principle, it is desirable to include in the calculation of REER measures all foreign countries whose producers compete with domestic producers either directly or indirectly through third markets. In practice, however, the limitations of data availability and the quality of the available statistics tend to restrict the number of countries to be considered.

3.3 Price deflators

The choice of an appropriate price index to capture domestic and foreign prices is of key importance when calculating reliable competitiveness indicators. In principle, the price deflator for foreign and domestic products should depict a representative sample of traded goods and services, possibly excluding primary products because of the convergence of the latter's international prices. In practice, however, there are no perfect price indices for traded-goods. The available alternatives are consumer price indices (CPIs), unit labour costs (ULCs), wholesale price indices (WPIs) or production price indices (PPIs), gross domestic product (GDP) deflators and export and import unit values – each with its own advantages and disadvantages.

3.3.1   Consumer price indices

Consumer price indices (CPIs), which are constructed on a more uniform basis in countries than wholesale price indices and GDP deflators, are most commonly used for measuring inflation and are available for most countries on a timely basis. However, a few limitations on their use in this context can be listed:

-    Firstly, consumer price indices are endogenous to the exchange rate (the inclusion of imported goods in the representative consumer basket may distort the measurement of underlying competitiveness);
-    secondly, consumer price indices may be distorted by price controls, taxes and subsidies on production and may therefore diverge from the underlying domestic cost of production;
-    thirdly, a relative decline in consumer price indices associated with "pricing to market" may not signify an improvement in competitiveness, but rather a temporary absorption of costs by producers and a reduction in profit margins; and
-    fourthly, consumer price indices include a large number of non-traded goods and services.

3.3.2   Unit labour costs

Unit labour costs in the manufacturing sector (i.e. labour cost per unit of output) capture a key underlying determinant of competitiveness in an important subset of traded goods in sectors with a high exposure to international trade. By focusing on costs instead of prices, unit labour costs avoid some of the endogeneity problems of consumer price indices. As with consumer price indices, however, there are also several limitations on the use of unit labour costs:

-    Firstly, data on labour productivity and labour compensation are not always reliable or available in time;
-    secondly, unit labour costs are not readily available for services which constitute a growing, although secondary component, of international trade;
-    thirdly, labour productivity may exhibit short-term countercyclical movements as companies tend to reduce labour during recessions; and
-    fourthly, unit labour costs in the manufacturing sector ignore other costs of production, notably intermediate goods, non-labour taxes, capital costs and the competitive position of other sectors.

3.3.3   Wholesale price indices

Wholesale or production price indices, by contrast, reflect the prices of tradeable goods more accurately than consumer prices. However, a weakness could be a lack of consistency in the construction of these indices across countries, as well as a substantial delay in the release of these statistics.

3.4   Weights

For each country, separate sets of weights can be calculated which individually or in combination best reflect the underlying trade flows of that particular country. In most cases, a distinction is drawn between differentiated manufactured goods and primary products. The objective is to refine weights for indicators relevant to assessing trade performance from a medium-term perspective.

For homogeneous products (or primary commodities) the international price tends to reflect the interaction between world demand and world supply. The movements among different exchange rates are likely to elicit demand and supply responses in each country which on aggregate will alter the "world" price of the commodity. The importance of changes in an individual country's exchange rate in affecting "international" prices is in part related to that particular country's share in the production (exports) or consumption (imports) of the commodity.

By contrast, manufactured goods are distinguished on the demand side by country of origin. Merchandise of a given kind supplied by producers in one country is not a perfect substitute in any particular market for merchandise of the same kind supplied by another country. Prices may therefore differ among similar types of manufactured goods in markets because of different elasticities of substitution of demand. Changes in exchange rates, among other things, may lead to shifts in demand among similar, but differentiated, manufactured goods of various countries, thus affecting export- and import-substituting trade performance. In a given country, the demand for a particular type of manufactured good can be met by domestic producers or by producers in other countries. Producers of import-substitutes therefore face competition from exporters in other countries while, from an export perspective, competition in each market is provided both by other exporters to and by the domestic suppliers of that market.

Most commonly, weighting schemes for indicators of competitiveness take into account trade in manufactured goods. With regard to trade in manufactured products, a distinction is made between competition among imports and locally produced import-competing goods, competition between own exports and goods produced locally in foreign markets and competition between own exports and those of other countries in third markets.

4.   The computation and interpretation of a price competitiveness indicator for South Africa

In accordance with international practice, the calculation of a real effective exchange rate index to serve as an indicator of changes in South Africa's external price competitive position was based on trade in and consumption of manufactured goods. To this end, the Bank made use of data on aggregate trade flows in **manufactured goods** (Standard International Trade Classification (SITC) categories 5 - 8, excluding SITC category 68)[1], which had been obtained from the United Nations Statistical Office for a considerable number of countries covering the period from 1994 to 1996.

Exchange rate weights were based on the average for the three years from 1994 to 1996 since this period is relatively recent and broadly coincided with the significant expansion of and shifts in the country's trade relations after the general elections in 1994.

The range of trading-partner countries covered in the computation of the real effective exchange rate index was increased to fourteen as opposed to the four major international trading partners (i.e. the United States of America, the euro area member states, the United Kingdom and Japan) which had been used in the previous real effective exchange rate index of the Bank. South Africa's major international trading partners now include the euro area, the United States of America, the United Kingdom, Japan, Switzerland, People's Republic of China: Mainland, People's Republic of China: Hong Kong, Korea, Zimbabwe, Canada, Australia, Sweden, Singapore and Israel. Together these countries account for about 85 per cent of South Africa's trade in manufactured goods, which in turn accounted for almost 60 per cent of total merchandise trade (excluding gold) in 1998.

Due to the lack of consistent and readily available information on international unit labour cost, consumer and production price indices were used in the calculation of the REER. The two indices produced broadly similar results. The Bank accordingly opted for production price indices in calculating the real effective exchange rate of the rand because these indices compare the prices charged by South African producers with those charged by their counterparts in other countries.

The actual computation of a competitiveness indicator for South Africa was based on the methodology used in the Information Notice System (INS) of the International Monetary Fund – a system established in 1983 to facilitate surveillance of the exchange rate policies of Fund members. Weights for trading-partner countries were computed by taking into account firstly, competition between imports and locally produced import-competing goods, secondly, competition between own exports and goods produced locally in foreign markets and thirdly, competition between own exports and exports of other countries in third markets. (See appendix for calculation of different weights.)

The new competitiveness indicator based on a different weighting scheme (the new weights are shown in Tables 1 to 3) displays a remarkably close correlation with the previously estimated effective exchange rate indices of the Reserve Bank. The weights of the old indicators were based on total trade in goods and services, adjusted for the currency denomination of the country's main import and export commodities.

Table 1. A comparison between previous and newly calculated weights

	Weights used in the previous real effective exchange rate index[1]	Newly calculated weights[2] (Before 1 Jan 1999)	Newly calculated weights[2] (After 1 Jan 1999)
Euro			
Germany		16,91	-
Italy		5,07	-
France		4,98	-
Netherlands		3,90	-
Belgium - Luxembourg[3] ...		3,54	-
Spain		1,34	-
Ireland.............................		0,86	-
Austria		0,83	-
Finland		0,81	-
Portugal		0,34	-
Euro[4]	31,6	38,58	35,70
USA..................................	42,8	14,44	15,15
UK	16,7	14,09	14,91
Japan	8,9	9,90	10,26
Switzerland		4,99	5,28
China, P.R.: Mainland............		2,91	3,11
China, P.R..: Hong Kong.......		2,59	2,62
Korea...................................		2,50	2,57
Zimbabwe.............................		2,27	2,27
Canada.................................		1,87	1,93
Australia...............................		1,59	1,62
Sweden		1,58	1,79
Singapore		1,55	1,62
Israel....................................		1,14	1,17
Total	100,0	100,0	100,0

1   Based on total trade in goods and services
2   Based on trade in manufactured goods
3   The Belgium/Luxembourg franc was treated as one currency because of the existence of monetary union between Belgium and Luxembourg prior to January 1999
4   The smaller weight of the euro after January 1999 can be attributed to the elimination of intra-trade among members of the European Economic and Monetary Union, which reduced the third-market export weight allocated to the euro after January

Table 2. "New" weights derived from international trade in manufactured goods before the introduction of the euro in January 1999

	Total weights	Bilateral import weights	Bilateral export weights	Third-market weights
Euro				
Germany..........................	16,91	20,78	8,23	13,25
Italy..................................	5,07	5,50	2,93	5,85
France	4,98	4,86	1,84	8,51
Netherlands	3,90	3,23	4,41	5,51
Belgium - Luxembourg[1] ...	3,54	2,92	4,87	4,16
Spain	1,34	1,04	1,39	2,24
Ireland.............................	0,86	0,75	0,24	1,84
Austria	0,83	0,92	0,14	1,24
Finland............................	0,81	0,95	0,05	1,14
Portugal	0,34	0,28	0,19	0,68
Euro......................................	38,58	41,23	24,29	44,42
USA.......................................	14,44	14,94	12,63	14,66
UK	14,09	14,81	19,44	6,41
Japan	9,90	11,03	6,18	10,03
Switzerland	4,99	3,47	12,14	2,70
China, P.R.: Mainland............	2,91	2,46	1,04	6,19
China, P.R.: Hong Kong........	2,59	2,45	3,82	1,78
Korea.....................................	2,50	2,37	3,22	2,19
Zimbabwe..............................	2,27	0,73	9,40	0,05
Canada..................................	1,87	1,02	1,21	5,23
Australia................................	1,59	1,22	2,73	1,63
Sweden	1,58	1,88	0,12	2,13
Singapore	1,55	1,47	1,34	2,04
Israel.....................................	1,14	0,92	2,44	0,54
Total	100,0	100,0	100,0	100,0

1 The Belgium/Luxembourg franc was treated as one currency because of the existence of monetary union between Belgium and Luxembourg prior to January 1999

Table 3. "New" weights derived from international trade in manufactured goods after the introduction of the euro in January 1999

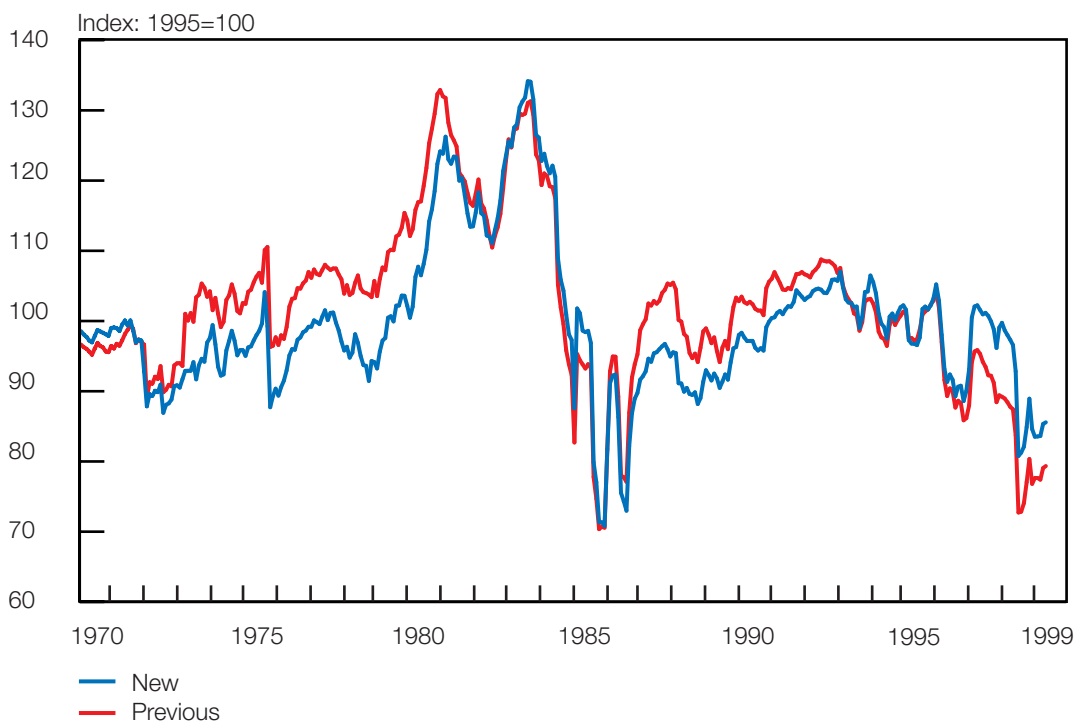|	Total weights	Bilateral import weights	Bilateral export weights	Third-market weights
Euro				
Germany	-	20,78	8,23	-
Italy	-	5,50	2,93	-
France	-	4,86	1,84	-
Netherlands	-	3,23	4,41	-
Belgium - Luxembourg[1] ...	-	2,92	4,87	-
Spain	-	1,04	1,39	-
Ireland.............................	-	0,75	0,24	-
Austria	-	0,92	0,14	-
Finland	-	0,95	0,05	-
Portugal	-	0,28	0,19	-
Euro......................................	35,70	41,23	24,29	29,47
USA......................................	15,15	14,94	12,63	18,34
UK	14,91	14,81	19,44	10,69
Japan	10,26	11,03	6,18	11,87
Switzerland	5,28	3,47	12,14	4,21
China, P.R.: Mainland...........	3,11	2,46	1,04	7,23
China, P.R.: Hong Kong........	2,62	2,45	3,82	1,93
Korea....................................	2,57	2,37	3,22	2,54
Zimbabwe..............................	2,27	0,73	9,40	0,07
Canada..................................	1,93	1,02	1,21	5,58
Sweden	1,79	1,88	0,12	3,20
Australia................................	1,62	1,22	2,73	1,78
Singapore	1,62	1,47	1,34	2,39
Israel.....................................	1,17	0,92	2,44	0,70
Total	100,0	100,0	100,0	100,0

1   The Belgium/Luxembourg franc was treated as one currency because of the existence of monetary union between Belgium and Luxembourg prior to January 1999

The old and the new measures of nominal and real effective exchange rates are compared in Graphs 1 and 2, whereas the relation between "new" nominal and real effective exchange rate indices is reflected in Graph 3.
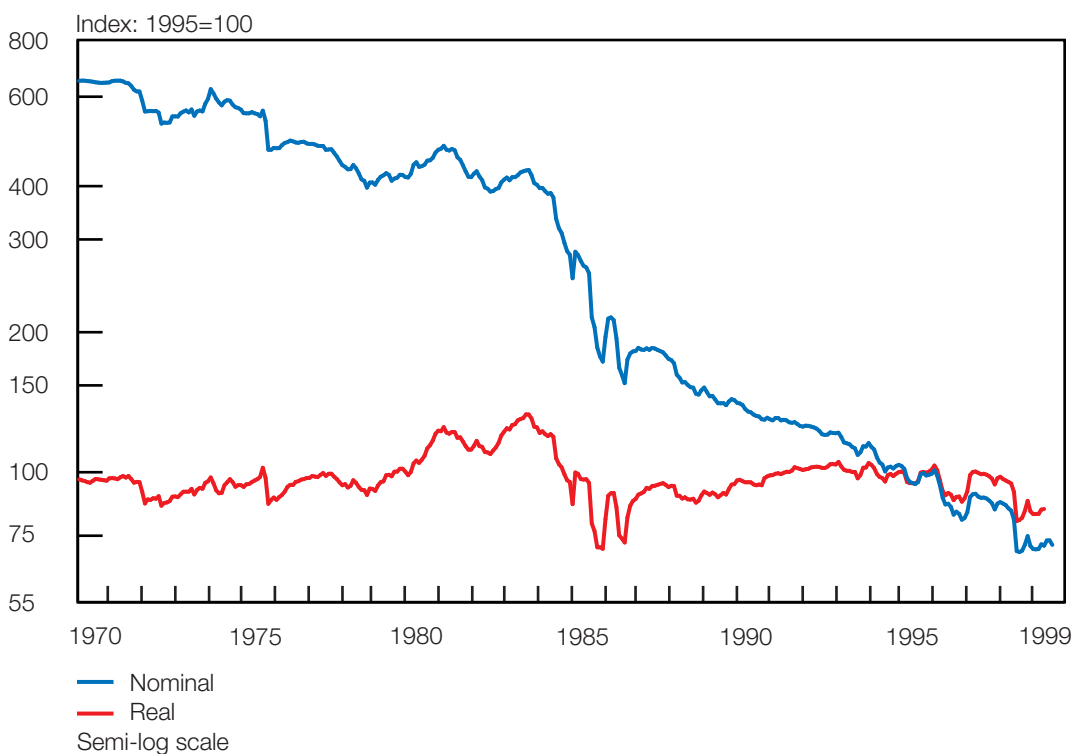
Graph 1: Nominal effective exchange rates

Index: 1995=100

New
Previous
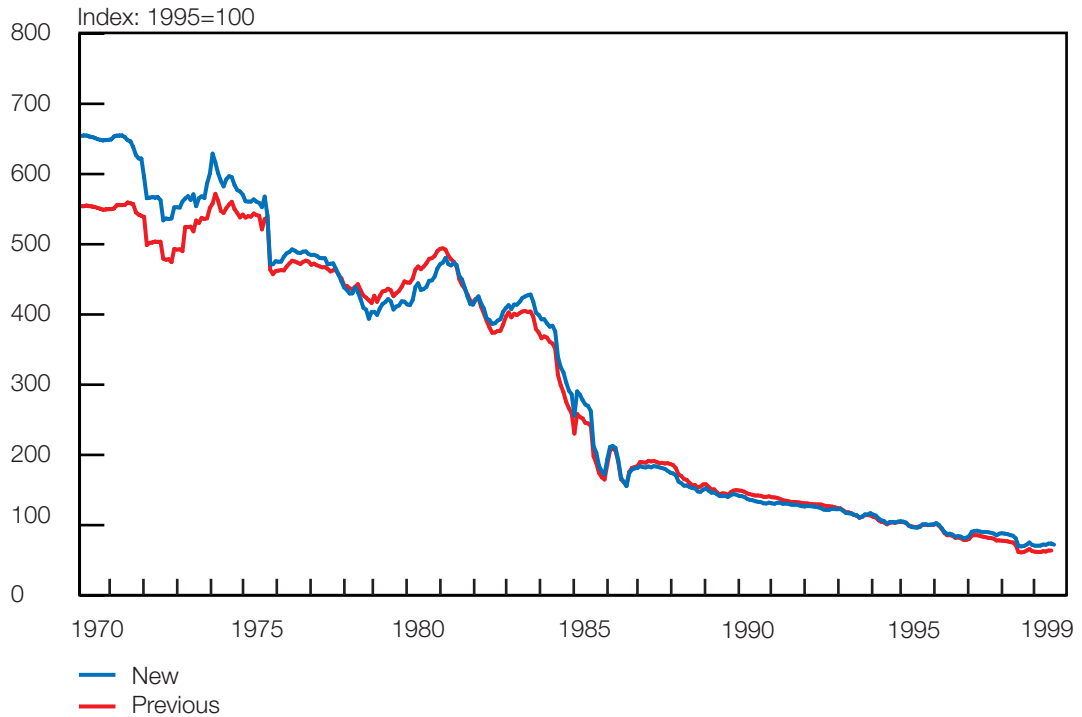
Graph 2: Real effective exchange rates

Index: 1995=100

New
Previous

Graph 3: Effective exchange rates (new indicators)

Index: 1995=100


- Nominal
- Real

Semi-log scale

The different subsets of weights calculated for the new competitiveness indicator, i.e. bilateral import weights, bilateral export weights or weights reflecting competition in third markets, may also be used for other purposes. In assessing, for example, the relationship between currency movements and future domestic prices, the import-weighted exchange rate may be of relevance. The impact of currency movements on the prices received by exporters could, in turn, in principle be captured by an export-weighted index. Third-market weights represent the market share of South Africa's main competitors in markets to which the country exports.

Owing to the high concentration of imports of manufactured goods originating from the euro area, the United States of America, the United Kingdom and Japan, and the sharp depreciation of the rand against those currencies in 1998, the real effective exchange rate index based on import weights displays a somewhat more favourable competitive position than the total trade-weighted index (Graph 4).

By contrast, an export-weighted effective exchange rate index with a relatively larger weight assigned to South Africa's other trading partners (i.e. excluding the euro area, the United States of America, the United Kingdom and Japan), reflects a less competitive position than the total trade-weighted index. However, when competition in third markets is included, the gains over time in the competitive position of exporters appear to be slightly stronger (Graph 4). Export prices may in the short term also be influenced by the currency denomination of international trade as well as the maturity structure of existing export contracts.

Graph 4: Real effective exchange rates (different weights)

Index: 1995=100

— Import-weighted index
— Total trade-weighted index (new indicator)
— Export (including third-market) weighted index
— Export-weighted index
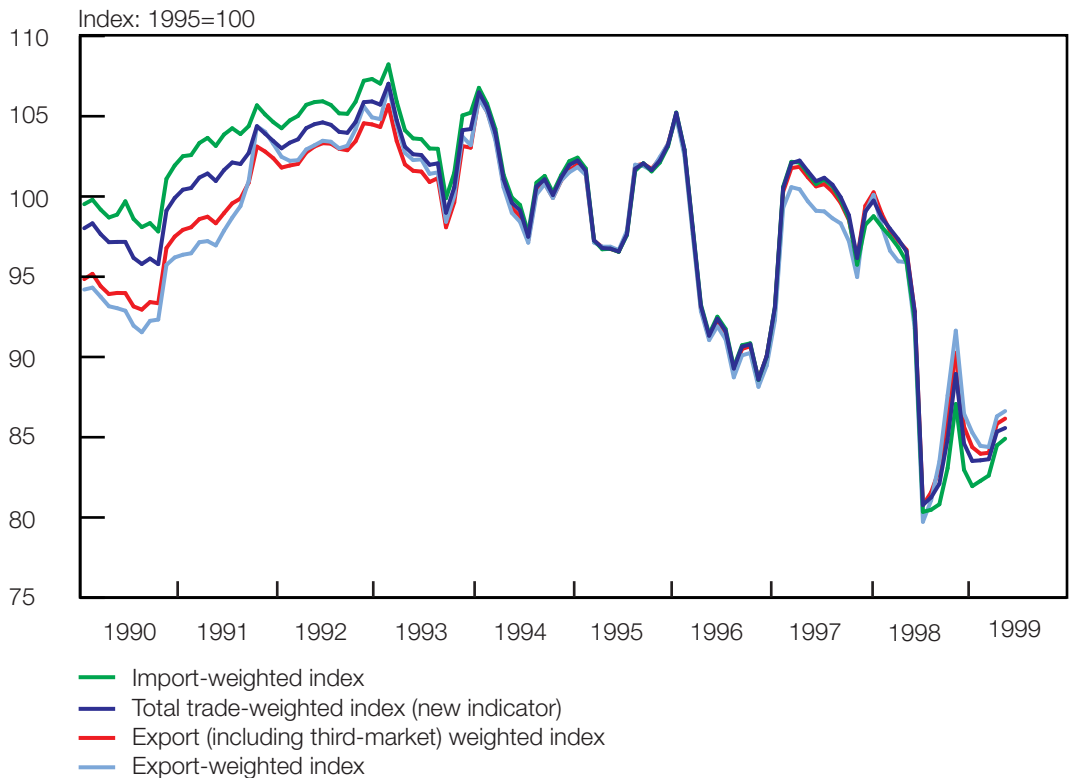
5.   Conclusion

The newly defined real effective exchange rate index based on trade in and the consumption of manufactured goods was designed principally to measure South Africa's competitiveness in international markets.   The new index furthermore reflects the movement of the rand in foreign exchange markets against a broader and more representative set of trading-partner countries.

The new competitiveness indicator which is published on page S-105 of this issue of the *Quarterly Bulletin* of the South African Reserve Bank, reveals a longer-term trend which is similar to that of the real effective exchange rate previously published by the Bank. The previously published real effective exchange rate of the rand was introduced in the early 1980s and was based on total trade in goods and services adjusted for the currency denomination of the country's most important export and import commodities. It was aimed more at measuring the degree of relative stability in the foreign exchange market than at measuring international competitiveness.

To conclude, real effective exchange rate indices provide an indication of cost and price competitiveness in international trade. No single indicator provides an unambiguous assessment of competitiveness. Besides the shortcomings that all indicators of competitiveness have, a country's competitive position is also affected by a range of other factors which do not lend themselves to direct quantification, such as reliability, quality, after-sales service, delivery times, financing arrangements and technological issues. Competitiveness indicators should therefore be used in conjunction with other measures to obtain an overall assessment of a country's competitiveness.

6. Appendix

The following formulae were used in calculating appropriate exchange rate weights: $X_i^k(M)$ represents country l's exports of manufactured goods to market k. $s_j^k(M)$ represents country j's share of all manufactured exports to market k and $w_i^k(M)$ is the share of country i's exports of manufactured goods shipped to market k. Therefore,

$$s_j^k(M) = \frac{X_j^k(M)}{\Sigma_{l \neq k} X_l^k(M)}$$

$$w_i^k(M) = \frac{X_i^k(M)}{\Sigma_{n \neq i} X_i^n(M)}$$

$\beta_i^m(M)$ and $\beta_i^x(M)$ represent the share of imports and exports in country i's international trade in manufactured goods.

$$\beta_i^m(M) = \frac{\Sigma_{l \neq i} X_l^i(M)}{\Sigma_{l \neq i} X_l^i(M) + \Sigma_{n \neq i} X_i^n(M)}$$

$$\beta_i^x(M) = \frac{\Sigma_{n \neq i} X_i^n(M)}{\Sigma_{l \neq i} X_l^i(M) + \Sigma_{n \neq i} X_i^n(M)}$$

$W_{ij}(M)$ represents the sum of two components: the import component $\beta_i^m(M) MW_{ij}(M)$ which reflects competition in the home market (country i), and the export component $\beta_i^x(M) XW_{ij}(M)$ which reflects competition in all foreign markets.

$$W_{ij}(M) = \beta_i^m(M) MW_{ij}(M) + \beta_i^x(M) XW_{ij}(M) \quad \text{where}$$

$$MW_{ij}(M) = s_j^i(M) \quad \text{and}$$

$$XW_{ij}(M) = \tfrac{1}{2} BXW_{ij}(M) + \tfrac{1}{2} TXW_{ij}(M)$$

$$= \tfrac{1}{2} w_i^j(M) + \tfrac{1}{2} \frac{\Sigma_{k \neq ij} w_i^k(M) s_j^k(M)}{\Sigma_{k \neq i} w_i^k(M)(1 - s_i^k(M))}$$

The import weight, $MW_{ij}(M)$ is the share of country i's imports of manufactured goods coming from country j. The bilateral export weight, $BXW_{ij}(M)$, is the share of country i's exports of manufactures going to country j. The third-market export weight, $TXW_{ij}(M)$, is equal to the weighted average over all third-country markets of country j's import share divided by a weighted average of the combined import share of all country i's competitors, where the weights are the shares of country i's exports to the various markets. The bilateral and third-market export weights are arbitrarily given equal importance in the computation of the overall export weight, $XW_{ij}(M)$.

7.   References

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