

Note on the revision of South Africa's nominal and real effective exchange rate indices

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Introduction

The effective exchange rate indices calculated by the South African Reserve Bank (the Bank) were revised comprehensively in 1999, with a minor amendment in 2003. Subsequently, the country's international trade patterns have changed significantly, prompted by forces such as shifts in global and domestic demand, the continued expansion and diversification of the domestic economy, the conclusion of new trade agreements and further adjustments to import duties. These developments in South Africa's international trade patterns necessitated a reassessment of the nominal effective exchange rate and real effective exchange rate. This note briefly discusses the revisions introduced on account of the reassessment.

Methodology

The initial calculation of a competitiveness indicator for South Africa in 1999 was based on the guidelines contained in the Information Notice System (INS) of the International Monetary Fund (IMF). The methodology used to calculate the Bank's measure of external price competitiveness is described in a note by S S Walters and B C de Beer titled "An indicator of South Africa's external competitiveness", which was published in the September 1999 *Quarterly Bulletin*. This methodology was retained for the current revision exercise.

The nominal effective exchange rate reflects movements in the external value of the rand against a basket of currencies of the country's main trading partners. The real effective exchange rate is the nominal effective exchange rate adjusted for the inflation differential between South Africa and its major trading-partner countries. In calculating these two indices, each currency in the basket should be assigned an appropriate weight. As before, the weighting scheme chosen continues to reflect trade in manufactured goods. Accordingly, the real effective exchange rate of the rand may be regarded as a barometer of external competitiveness in manufacturing. The weights assigned to the selected trading partners reflect the price competition between South African exports and locally produced goods in foreign markets, between imports from the rest of the world and locally produced goods in South Africa, and between South African exports and exports of other countries in third-currency markets. Relevant formulae are shown in Annexure A.

In compiling the Bank's effective exchange rate indices, trading-partner countries or areas were selected on the basis of their relative importance in South Africa's bilateral trade. Foreign trade patterns for the period 1994–1996 formed the basis of the previously calculated indicators. For the new indicators, data for the period 2003–2005 on trade between South Africa and its trading partners, and between each pair of trading partners were extracted from the database of the United Nations. As in the previous calculation, the data covered trade in manufactured goods – specifically goods included in Standard International Trade Classification (SITC) categories 5 to 8, but excluding SITC category 68.¹

- 1 SITC-5 – Chemicals and related products
- SITC-6 – Manufactured goods classified chiefly by material
- SITC-7 – Machinery and transport equipment
- SITC-8 – Miscellaneous manufactured articles
- SITC-68 – Non-ferrous metals

The number of trading-partner countries or areas selected and incorporated into the calculation was revised from 13 to 15, focusing on those countries or areas that each represented more than 1 per cent of South Africa's total bilateral trade in manufactured goods. Overall, South Africa's trade with these 15 countries or areas covered almost 86 per cent of its total imports and 77 per cent of its total exports of manufactured goods. Allowing

for not only bilateral import and bilateral export, but also for third-market competition, the revised weights are shown in Table 1.

Table 1 Revised weights based on international trade in manufactured goods

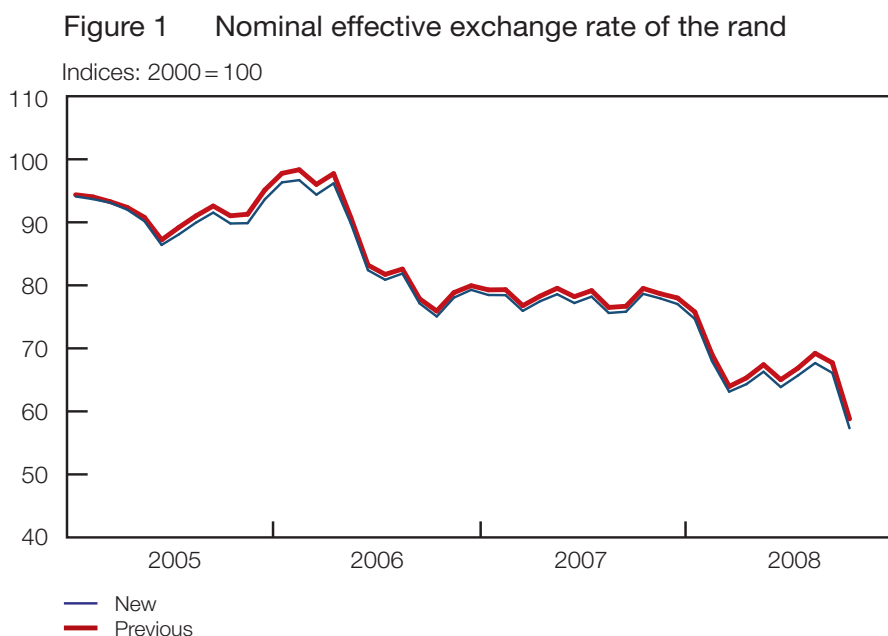
Country/area	Bilateral import weight	Bilateral export weight	Third-market weight	Total weight
Euro area	43,04	25,58	25,70	34,82
United States	13,29	19,12	14,20	14,88
China	12,70	2,85	21,64	12,49
United Kingdom	10,23	13,98	8,52	10,71
Japan	7,19	15,77	11,00	10,12
Switzerland	1,83	4,42	3,47	2,83
Australia	1,64	4,54	0,43	2,04
India	2,06	2,18	1,73	2,01
Sweden	2,27	0,63	2,70	1,99
Republic of Korea	0,24	2,55	5,23	1,96
China, Hong Kong SAR	1,39	1,87	1,30	1,48
Singapore	1,23	0,93	2,22	1,40
Brazil	1,79	0,92	0,91	1,37
Israel	0,84	1,89	0,95	1,11
Zambia	0,27	2,77	0,002	0,80
Total	100,00	100,00	100,00	100,00

Table 2 A comparison between previous and revised weights

Country/area	Previous weight Per cent	Revised weight Per cent
Euro area	36,38	34,82
United States	15,47	14,88
China	3,14	12,49
United Kingdom	15,37	10,71
Japan	10,43	10,12
Switzerland	5,54	2,83
Australia	1,68	2,04
Sweden	1,81	1,99
India	–	2,01
Republic of Korea	2,64	1,96
China, Hong Kong SAR	2,70	1,48
Singapore	1,66	1,40
Brazil	–	1,37
Israel	1,22	1,11
Zambia	–	0,80
Canada	1,96	–
Total	100,00	100,00

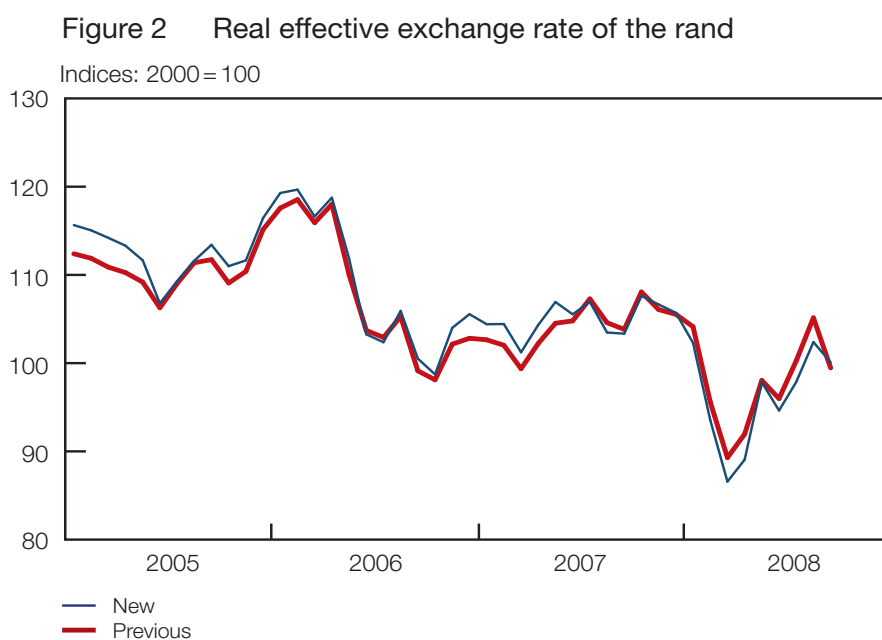
As shown in Table 2, the importance of China in South Africa's external trade in manufactured goods increased substantially from 1994–1996 to 2003–2005. The outcome of the revision confirmed that the euro area and the United States of America remained South Africa's largest trading partners in manufactured goods, while the United Kingdom lost its third position to China to become the fourth largest partner. As a result, Japan moved to the fifth position. New partner countries whose trade with South Africa had increased over time were added, namely Brazil, India and Zambia. Conversely, Canada's share of trade with South Africa receded over time, leading to the exclusion of the Canadian dollar from the new basket.

Figure 1 illustrates that the difference between the old and the new nominal effective exchange rate index is small, reflecting that, with few exceptions, global trade patterns change only gradually.



In calculating a real effective exchange rate index for South Africa, the Bank opted to use producer price indices for manufactured goods, since these indices are aligned with the calculation of a competitiveness indicator for the manufacturing sector and are readily available for the set of trading-partner countries identified by the Bank. Overall, producer prices rather than prices of manufactured goods would be less relevant and susceptible to greater volatility, due to the inclusion of commodity prices in overall producer prices.

Figure 2 compares the previously used and new real effective exchange rates with each other. Differences between the two barometers of competitiveness are fairly small, although larger than those for the nominal effective exchange rate.



Conclusion

The newly calculated indices of the nominal and real effective exchange rates of the rand incorporate currency weights based on patterns of international trade in manufactured goods for the period 2003–2005, and display movements that are similar to the previously published indices. The revised set of weights will be applied in the calculation of the nominal and real effective exchange rates as from 1 January 2005. As the revised series will be statistically linked to the previously calculated effective exchange rate time series from that date, data prior to 1 January 2005 will not be affected by the revision exercise.

The implementation of the revised series will improve the assessment of South Africa's competitiveness in global markets, as well as the analysis of movements of, and trends in, the exchange value of the rand against a basket of currencies. While no single indicator provides an incontestable measure of competitiveness, the real effective exchange rate index gives an indication of cost and price competitiveness in international trade in manufactured goods.

Annexure A: Formulae

The following formulae were used in calculating appropriate exchange rate weights: $X_i^k(M)$ represents country i'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,

$$s_j^k(M) = \frac{X_j^k(M)}{\sum_{1 \neq k} X_i^k(M)}$$

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

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

$$\beta_i^m(M) = \frac{\sum_{1 \neq i} X_1^i(M)}{\sum_{1 \neq i} X_1^i(M) + \sum_{n \neq i} X_i^n(M)}$$

$$\beta_i^x(M) = \frac{\sum_{n \neq i} X_i^n(M)}{\sum_{1 \neq i} X_1^i(M) + \sum_{n \neq i} X_i^n(M)}$$

$W_{ij}(M)$ 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.

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

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

$$\begin{aligned} XW_{ij}(M) &= \frac{1}{2} BXW_{ij}(M) + \frac{1}{2} TXW_{ij}(M) \\ &= \frac{1}{2} w_i^j(M) + \frac{1}{2} \frac{\sum_{k \neq ij} w_j^k(M) s_j^k(M)}{\sum_{k \neq i} w_j^k(M) (1 - s_i^k(M))} \end{aligned}$$

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, $XW_{ij}(M)$.