

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

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Introduction

Nominal effective exchange rate indices are widely used to track the external value of a currency against a weighted basket of currencies, whereas real effective exchange rate indices serve as a yardstick of changes in a country's international competitiveness of production over time.

As a result of gradual changes in trade patterns between countries, it is standard practice to periodically revise the bilateral trade weights of the countries considered in the computation of the weighted average effective exchange rate to reflect the most recent trade patterns. The global financial crisis in 2008 had a visible impact on global trade patterns and resulted in the reconfiguration of the established trade hierarchy.

This note briefly describes the revision of the weights and trading-partner countries used in the computation of South Africa's nominal and real effective exchange rates. To this end, the Balance of Payments Division of the Bank has revised the calculation of the nominal and real effective exchange rate indices using more up-to-date bilateral data for trade in manufactured products during the period 2010 to 2012.

Further detail about the revision is provided below. As before, the focus in the construction of the effective exchange rate indices is on trade in manufactured goods and competitiveness in manufacturing.

Methodology

The Balance of Payments Division of the Bank has recently conducted the exercise of revising the country weights used in the computation of the effective exchange rates published by the Bank. Updates of South Africa's weighted average effective exchange rates were previously published in 1999 (based on 1994 to 1996 trade data) and 2008 (based on 2003 to 2005 trade data). These revisions, including the current one, were done in accordance with the methodology used in the Information Notice System (INS) of the International Monetary Fund (IMF) – a system established in 1983 to facilitate surveillance of the exchange rate policies of IMF member countries. The INS relies on trade data obtained from the United Nations (UN) database reflecting trade in manufactured goods according to the Standard International Trade Classification (SITC), categories 5 to 8, excluding category 68.¹

This latest update was conducted using bilateral trade data between South Africa and its largest trading-partner countries for the period 2010 to 2012. As before, weights for trading-partner countries were computed by taking into account competition between imports and locally produced import-competing goods, between own exports and similar produced in foreign markets, and between own exports and the exports of other countries in third markets. The bilateral and third-market weights building up to the new competitiveness indicators based on the aforementioned weighting scheme are displayed in Table 1. The new and previous weights are compared in Table 2. The revised set of weights will be applied to the calculation of the nominal and real effective exchange rates with effect from 1 January 2010; data prior to 1 January 2010 will not be affected. Annexure A may be consulted for the detailed formulas used to establish the weights.

Apart from the consideration of trade weights in constructing the competitiveness indicators, three other factors were noted, namely the base period, country coverage and price deflator. A base period for an economy is regarded as appropriate when it is associated with a period of

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



relative stability in economic activity, including trade performance and low volatility in financial markets, among other factors.

In the case of South Africa, the year 2010 seemed to satisfy most of the requirements and was thus selected as the base year. Regarding country coverage, the important countries whose producers compete with domestic producers either directly or indirectly through third markets were included. In addition, verification of timeous data availability for the elected countries was undertaken.

The choice of a price index that is representative of traded goods – in this instance preferably manufactured goods – is important. If competitiveness in a very broad sense is to be tracked, the available alternatives for such price indices are the consumer price index, unit labour cost, the producer price index, gross domestic product as well as import and export unit values. Each of these has its own advantages and disadvantages, with the consumer price index being flawed by virtue of it being endogenous to the exchange rate, partly dominated by non-traded goods and service, and being distorted by price controls and taxes. Unit labour cost data, on the other hand, are not always timeously available and could reflect short-term cyclical movements with little bearing on competitiveness. Unlike unit value indices are not popular and thus not computed by some countries. Although the construction of the producer price indices varies somewhat across countries, these prices are readily available and reflect more accurately the prices of representative goods.

In computing the real effective exchange rate index, the producer price index was chosen as the appropriate price deflator. Middle exchange rates are used to establish the effective exchange rate indices using geometric averages.

Results

The newly calculated indices display movements that are similar to the previously published indices that were updated in 2008 using bilateral manufacturing trade data for the period 2003 to 2005. Despite displaying a similar trend, the levels of the previously and newly calculated indices deviate, on average, by about 1 per cent.

Notable outcomes of the 2014 revision are as follows:

- As a result of increased trade, particularly in the export of manufactured goods for categories 5 to 8, the number of trading-partner countries incorporated in the trade-weighted basket increased from 15 to 20 and now includes four African countries, namely Botswana, Zambia, Zimbabwe and Mozambique (see Tables 1 and 2). South Africa's trade with these 20 countries covered 86,9 per cent of total manufactured imports and 81,7 per cent of total exports of manufactured goods.
- South Africa's five most important trading-partner countries remained unchanged from the previous revision conducted in 2008. However, the relative ranking of the top trading-partner countries changed when China overtook the US to become South Africa's second-largest trading partner after the euro area. In addition, Japan became the country's fourth-largest trading-partner country, moving the UK to fifth position.
- The decline in the bilateral trade weight with the euro area largely reflected a significant decline in the importation of manufactured goods from euro area countries, pushing down the bilateral trade import weight between South Africa and the euro area to 30,8 per cent during 2010 to 2012. Notwithstanding this decline, South Africa's exports of manufactured goods to Europe, in particular vehicles and transport equipment, gained some ground, increasing the export weight concerned to 26,9 per cent points over the period.

- South Africa's imports of manufactured goods from China surged in 2010 to 2012, with the majority of the increase noted in the subcategories for machinery and transport equipment, while the exports of these manufactured goods to China moderated somewhat. As a result, the overall weight of China in the basket increased from 12,5 per cent to 20,5 per cent in the current revision.

Table 1: Comparison of weights for international trade in manufactured goods

Country/area	Bilateral import weights		Bilateral export weights		Third-market weights	
	Previous*	Revised**	Previous*	Revised**	Previous*	Revised**
Euro area.....	43,04	30,83	25,58	26,87	25,70	25,58
China.....	12,70	24,82	2,85	2,03	21,64	22,48
United States.....	13,29	12,19	19,12	18,14	14,20	15,23
Japan.....	7,19	6,04	15,77	2,97	11,00	9,06
United Kingdom.....	10,23	5,12	13,98	5,94	8,52	8,39
India.....	2,06	4,39	2,18	2,29	1,73	4,07
Republic of Korea.....	0,24	3,57	2,55	0,74	5,23	3,61
Botswana.....	-	0,41	-	10,28	-	0,40
Thailand.....	-	2,14	-	0,81	-	1,82
Sweden.....	2,27	2,21	0,63	0,55	2,70	1,50
Switzerland.....	1,83	1,94	4,42	0,13	3,47	1,81
Zambia.....	0,27	0,13	2,77	7,66	0,002	0,17
Malaysia.....	-	1,48	-	0,28	-	1,48
Zimbabwe.....	-	0,15	-	6,36	-	0,39
Australia.....	1,64	0,86	4,54	3,04	0,43	0,58
Brazil.....	1,79	1,18	0,92	1,74	0,91	0,51
Mozambique.....	-	0,08	-	1,07	-	0,10
Canada.....	-	0,90	-	5,29	-	1,17
Poland.....	-	0,92	-	1,01	-	0,67
Israel.....	0,84	0,63	1,89	1,78	0,95	0,98

* 'Previous' refers to 2003–2005

** 'Revised' refers to 2010–2012



Table 2: Comparison between previous and revised weights

Country/area	Previous weights 2003–2005 Per cent	Revised weights 2010–2012 Per cent
Euro area.....	34,82	29,26
China.....	12,49	20,54
United States.....	14,88	13,72
Japan	10,12	6,03
United Kingdom	10,71	5,82
India	2,01	3,98
Republic of Korea	1,96	3,10
Botswana	-	2,09
Thailand.....	-	1,86
Sweden.....	1,99	1,81
Switzerland.....	2,83	1,78
Zambia	0,80	1,42
Malaysia	-	1,27
Zimbabwe	-	1,25
Australia	2,04	1,19
Brazil	1,37	1,16
Canada	-	0,98
Mozambique	-	0,97
Poland.....	-	0,89
Israel	1,11	0,88
China, Hong Kong SAR.....	1,48	-
Singapore.....	1,40	-
Total	100,00	100,00

- Exports destined for Japan declined during the period under review, partly due to the March 2011 earthquake and tsunami which forced the country back into recession. South Africa's bilateral export weight with Japan declined from 15,8 per cent in the previous revision to 3,0 per cent in the current revision. Over the same period, the import weight contracted marginally to 6,0 per cent.
- The overall weight of the UK almost halved between the revision periods, declining from 10,7 per cent to 5,8 per cent for the period 2010 to 2012.
- South Africa's bilateral trade with African countries increased, consistent with the region's increase in economic growth. The revised weights of trading-partner countries in the basket are indicative of the gradual growth in South Africa's trade with Botswana, Mozambique, Zambia and Zimbabwe.

Figure 1 illustrates the relatively small divergence between the old and the new nominal effective exchange rate indices. Figure 2 depicts the real effective exchange rate index, that is, the nominal effective exchange rate adjusted for inflation differentials using the producer price indices for manufactured goods.

The revised set of weights will be applied to the calculation of the nominal and real effective exchange rates from 1 January 2010.

Figure 1 Nominal effective exchange rate of the rand

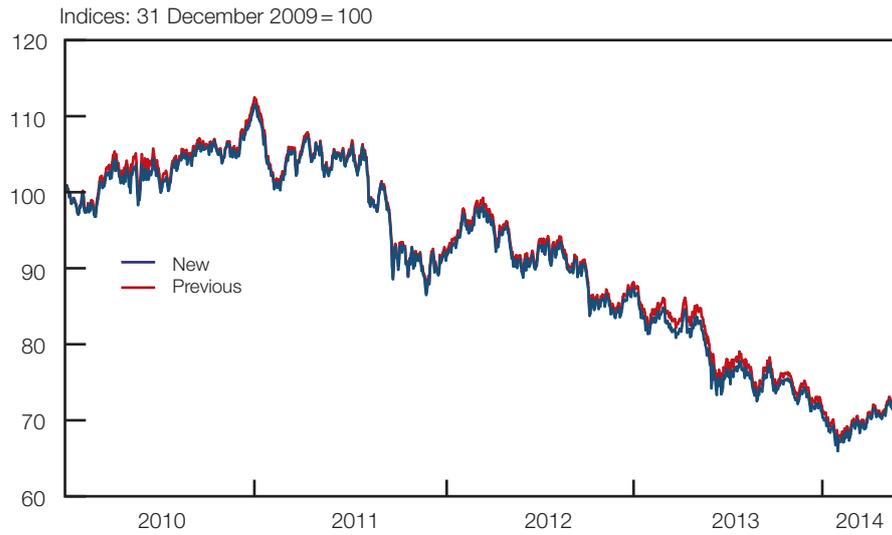
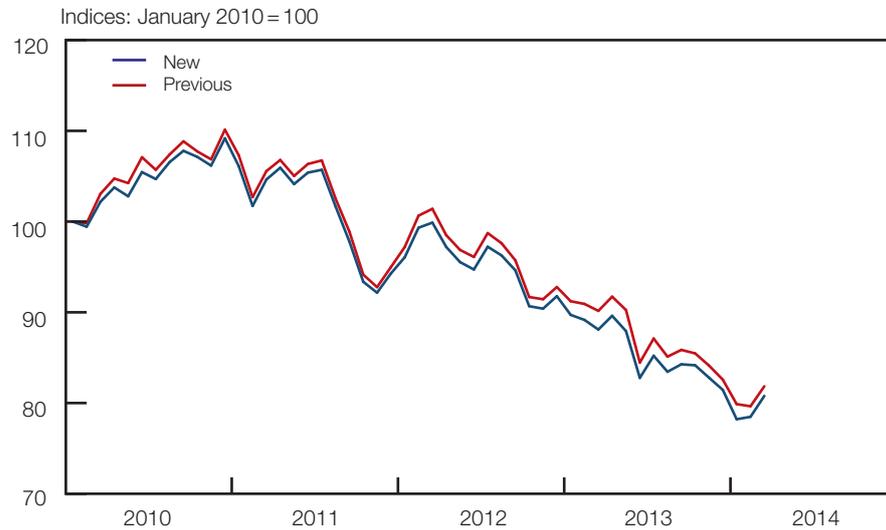


Figure 2 Real effective exchange rate of the rand



Planned publication

The Bank is planning to start releasing the new indices on a continuous basis from 1 July 2014. Further details will be provided on the Bank's website.

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,

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

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

$\beta_i^m(M)$ 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, $XW_{ij}(M)$.