

Developments in the Trade-Weighted Index¹

Introduction

This article provides some background on the history and methodology of the trade-weighted index (TWI) of the Australian dollar published by the Reserve Bank. The TWI is a weighted average of a basket of currencies that reflects the importance of the sum of Australia's exports and imports of goods by country. The TWI is often used as one indicator of Australia's international competitiveness and is a useful gauge of the value of the Australian dollar when bilateral exchange rates exhibit diverging trends.²

The weights in the TWI are calculated on an annual basis and the changes made in the weighting scheme applicable for 2002/03 are described below. While the changes from one

year to the next tend to be small, some important trends due to shifting trade patterns and methodological changes are observable over the past 30 years.

Weighting Scheme for the TWI

The Bank adopted the current methodology for the calculation of the TWI in October 1988. At that time the index was subject to two important methodological changes.

Firstly, a geometric average of a basket of currencies chosen to be representative of Australia's trading patterns replaced the arithmetic average that had been used until then. This procedure is still used today and can be summarised by the following formulae:

$$\begin{aligned} \text{TWI}_t &= \left[\frac{\text{A\$}_t}{\text{A\$}_0} \right]^{\alpha_1} \times \left[\frac{E_t^2}{E_0^2} \times \frac{\text{A\$}_t}{\text{A\$}_0} \right]^{\alpha_2} \times \dots \times \left[\frac{E_t^{23}}{E_0^{23}} \times \frac{\text{A\$}_t}{\text{A\$}_0} \right]^{\alpha_{23}} \times \text{TWI}_0 \\ &= \left[\frac{E_t^2}{E_0^2} \right]^{\alpha_2} \times \dots \times \left[\frac{E_t^{23}}{E_0^{23}} \right]^{\alpha_{23}} \times \frac{\text{A\$}_t}{\text{A\$}_0} \times \text{TWI}_0 \end{aligned}$$

1. This article was prepared by Chris Becker and Michael Davies, International Department.

2. See Ellis L (2001), 'Measuring the Real Exchange Rate: Pitfalls and Practicalities', Reserve Bank of Australia Discussion Paper 2001-04, for a discussion on the choice of alternative weighting schemes.

where:

A\$ = units of US dollars
per Australian dollar

E^i = units of foreign currency i
per US dollar ($i = 2, \dots, 23$)

α_1 = weight of the US dollar

α_i = weight of the foreign currency i
($i = 2, \dots, 23$)

0 = base period

t = current period

Secondly, the method for calculating the weights was changed somewhat. Prior to 1988 the weight of countries with relatively small trade shares was added to the weight of a relatively large trading partner with which they could be most appropriately grouped. Since many countries maintained some form of formal link with major currencies throughout much of the 1970s and early 1980s it was possible to group currencies in a systematic way. However, as exchange rate regimes became more diverse and flexible this methodology began to lose its usefulness. Under the revised method, the basket of currencies chosen for inclusion in the TWI is such that they cover at least 90 per cent of Australia's two-way merchandise trade.³

The weights for the TWI are revised annually to capture changing trade patterns, occasionally giving rise to changes in the currency composition of the basket. Changes to the weights are usually calculated in September, with the re-defined index spliced onto the existing TWI on the first business day in October. The base for the index remains May 1970.

Changes for the 2002/03 TWI

Data published by the Australian Bureau of Statistics for Australia's trade in 2001/02 suggest that the 23 countries included in the 2001/02 TWI remain the appropriate ones for

the current revision. However, changes in trade shares have led to some minor changes in the weights (Table 1):

- The relative importance of Australia's trade with the Euro area and the United Kingdom has increased, with their combined weight in the TWI rising by 0.7 percentage points to 17.5 per cent.
- The weight of the Japanese yen decreased by 0.5 percentage points to 17.2 per cent. Despite the steady trend decline in the importance of Australia's two-way trade with Japan, it remains Australia's largest trading partner and consequently the yen attracts the largest weight in the TWI.

Table 1: Weights in the Trade-Weighted Index
Per cent

Currency	Trade weight	
	Current	Previous
Japanese yen	17.2058	17.6723
United States dollar	15.0681	15.4706
European euro	12.3981	11.8561
Chinese renminbi	8.5754	7.6089
South Korean won	6.5588	6.3315
New Zealand dollar	5.5689	5.2025
UK pound sterling	5.1365	4.9855
Singapore dollar	4.0090	4.5011
New Taiwan dollar	3.5887	4.1840
Indonesian rupiah	3.2399	2.9093
Malaysian ringgit	2.8733	3.0400
Hong Kong dollar	2.4360	2.3977
Thai baht	2.3356	2.2740
Saudi Arabian riyal	1.6315	1.7327
Canadian dollar	1.5743	1.6531
Indian rupee	1.5280	1.2919
Vietnamese dong	1.0583	1.3328
South African rand	0.9971	0.9885
PNG kina	0.9588	1.1404
United Arab Emirates dirham	0.8940	1.0353
Philippine peso	0.8454	0.9134
Swedish krona	0.8310	0.8238
Swiss franc	0.6875	0.6546

Source: RBA

3. The data source for the calculation of the weights is 'International Merchandise Trade, Australia', ABS Cat No 5422.0.

- The combined weight of other countries in the Asia-Pacific region has remained broadly unchanged.
- The weight of the US dollar in the TWI fell slightly from 15.5 per cent to 15.1 per cent.

Longer-term Developments in the Weighting Scheme

Prior to the float of the Australian dollar in 1983 the value of the currency was pegged with reference to the UK pound up to December 1971 and then the US dollar (Graph 1). In September 1974 the peg to the US dollar was abandoned in favour of setting the value of the Australian dollar on a multilateral basis against a basket of currencies. This decision reflected an increasing degree of flexibility and diversity in exchange rate regimes. Fixing the value of the Australian dollar against any one bilateral rate risked unfavourable implications for

Graph 1



Australia's international competitiveness when the exchange rates of major trading partners exhibited diverging trends. It was for this purpose that the Bank initially constructed the TWI, against which the value of the Australian dollar was determined from September 1974 to the eventual float in

Table 2: Historical TWI Weights
Per cent

	1974/75	1979/80	1984/85	1989/90	1994/95	1999/00	2002/03
America	26.05	33.56	25.53	20.12	18.27	19.05	16.64
US dollar	23.14	31.12	23.92	17.94	16.38	17.35	15.07
Canadian dollar	2.90	2.44	1.61	2.19	1.89	1.70	1.57
Asia-Pacific	41.07	37.70	47.54	56.10	61.99	58.51	60.78
Japanese yen	25.85	22.87	24.84	26.65	23.69	18.13	17.21
Chinese renminbi	1.09	2.26	1.92	2.76	4.90	6.04	8.58
South Korean won	(a)	(a)	2.75	4.24	5.65	6.14	6.56
Singapore dollar	1.68	2.10	2.98	3.17	4.30	3.83	4.01
NZ dollar	4.43	4.67	4.85	5.16	6.18	5.87	5.57
Other currencies	8.02	5.80	10.19	14.12	17.28	18.50	18.86
Europe	28.94	23.11	20.71	21.59	18.05	21.48	19.05
European euro	12.10	12.21	14.12	13.20	10.41	13.53	12.40
UK pound	14.66	8.32	6.59	6.14	5.66	5.99	5.14
Swedish krona	1.47	1.93	(a)	1.21	1.04	1.04	0.83
Swiss franc	0.71	0.65	(a)	1.04	0.93	0.92	0.69
Other currencies	3.94	5.62	6.22	2.19	1.69	0.96	3.52

(a) Not separately included

Source: RBA

December 1983. At the time of its inception the calculation of the TWI was back-cast to May 1970.

While the composition of the basket of currencies that form the TWI and bilateral trade shares have changed only marginally in recent years, definitive trends are discernible in the currency weights for the TWI over the past 30 years. A summary of the current and historical regional trade weights is given in Table 2.

The composition of the TWI has changed predominantly due to shifts in the relative importance of Australia’s trading partners over time, but also as a result of methodological changes.

In the early 1970s the TWI was dominated by the US dollar, UK pound, Japanese yen, and major European currencies. These ‘major currencies’ had a combined weight of almost 80 per cent (Graph 2). This dominance in part reflected allocation of the merchandise trade of Australia’s smaller trading partners to these major currencies. For example, Australia engaged in some trade with Egypt, Iran, Korea and the Philippines, but because the value of trade was insufficient to qualify for an individual currency weighting, their weights were added onto that of the US dollar. As a result major currencies such as the US dollar, and to a lesser extent the UK pound, were allocated weights considerably larger than indicated by their direct trade shares. With the

exception of Japan, the currencies of countries in the Asia-Pacific region together attracted a relatively small weight at that time, partly because the weights of many of the countries in the region were allocated to the US dollar, but also because trade linkages with the region were not as strong as they are today.

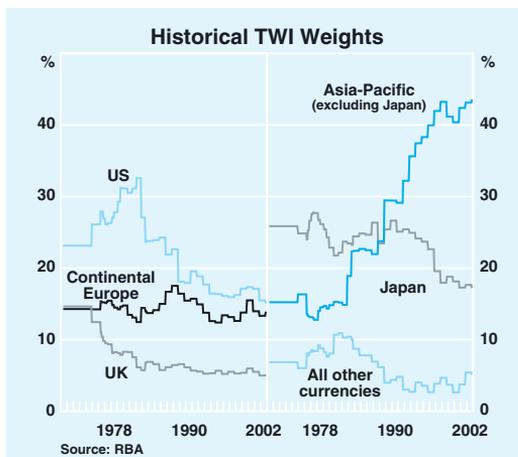
Between 1970 and 1982, the importance of the ‘major currencies’ fell to 75 per cent. The UK pound’s weight fell sharply over this period from 15 per cent to 6 per cent, with most of the decline attributable to a fall in the importance of imports from the United Kingdom. The US dollar weight rose steadily over the period. However, this reflected increased trade with smaller Asian countries, which were included in the US dollar basket, rather than higher trade with the United States itself. The Japanese yen and continental European currency weights were broadly unchanged over the decade.

Between 1982 and 1990, the composition of the TWI changed markedly, with the weighting of non-Japan Asia-Pacific currencies doubling to nearly 30 per cent at the expense of the US dollar. This sharp increase in the weighting mainly reflected greater trade with the region. Methodological changes made to the calculation of the index in 1988 also had an impact, with a number of smaller Asian countries being included separately in the TWI, rather than as part of the US dollar weight. The yen and European currency weights increased slightly over the period, while the UK pound weight was broadly unchanged.

Over the 1990s, the importance of non-Japan Asia-Pacific currencies continued to increase rapidly, and these currencies now constitute nearly 45 per cent of the TWI. One notable departure from this broad trend was the period between 1998 and 2000 when the Asian financial crisis significantly reduced trade with the region. Most of the trend rise in the weight for the region has been at the expense of Japan and North America.

While the explicit weight of the US dollar in the TWI has been declining over the 1990s, reflecting the reduced trade weight with the

Graph 2



United States, greater trade with a number of countries whose exchange rates are closely managed against the US dollar make the implicit weight attracted by the US dollar considerably larger. When taking this into consideration the weight of the US dollar roughly doubles from an explicit weight of around 15 per cent under the current weights to an implicit weight of over 30 per cent.

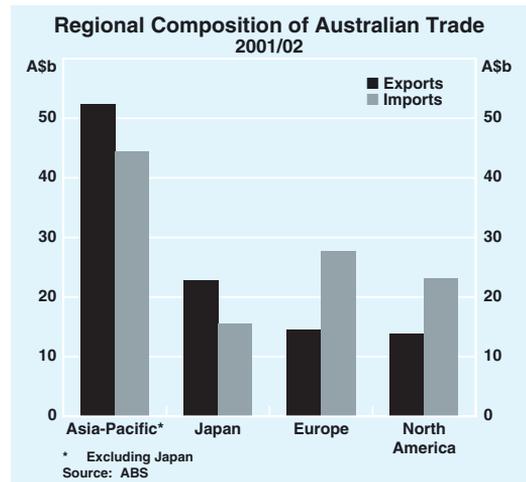
Import and Export Shares

The trade weights discussed above are based on the sum of Australia's exports and imports to determine the overall two-way trade linkages with other countries. However, Australia's pattern of trade varies quite widely in the relative regional composition of exports and imports. While some regions are clearly major trading partners because they are an important export destination, this does not necessarily mean that the region is a similarly important source of imports. The converse is generally true of regions that are important trading partners principally due to their dominance in supplying imports to Australia.

Based on the data used to construct the latest trade weights, the Asia-Pacific region is the most important destination for Australian exports and the most important source of imports, even when Japan is excluded (Graph 3). While a large proportion of Australia's resource exports of metal ores and coal are destined for Japan and smaller Asian countries, the basic manufactures and consumer goods that we import from the region hold a somewhat smaller relative share of total imports. The opposite is true for Europe and North America; imports from these regions are relatively more important than exports to them.

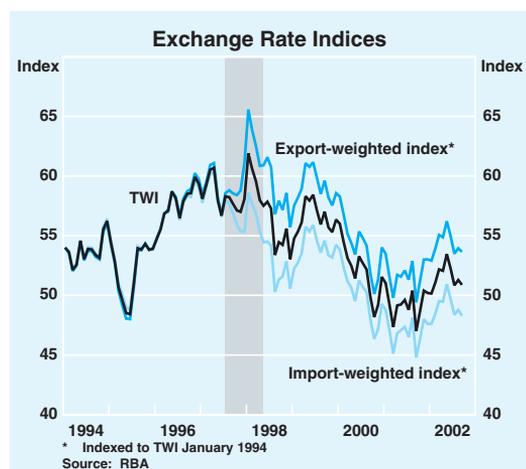
At times it may be instructive to take the regional composition of exports and imports into account when analysing multilateral

Graph 3



exchange rate movements. In the past the Bank has made reference to export- and import-weighted exchange rate indices when there have been important divergences from the TWI.⁴ The most recent episode where this occurred was during the Asian financial crisis in 1997/98. At that time the devaluation of the currencies of Australia's important export destinations in the Asian region led to an appreciation in the export-weighted index of the Australian dollar (Graph 4). However, the shock to the Asia-Pacific region more widely

Graph 4



4. Refer also to Reserve Bank of Australia (1998), 'Alternative Measures of the Effects of Exchange Rate Movements on Competitiveness', Reserve Bank of Australia *Bulletin*, January.

meant that the Australian dollar was also subject to downward pressure, resulting in a fall in its value against the currencies of other advanced industrial countries. This was reflected in a depreciation of the exchange rate on an import-weighted basis.

The wedge that opened up between the indices over the course of 1997/98 is

highlighted by the shaded area in Graph 4. Over this period, monthly movements in the indices diverged by up to 4 percentage points. However, such sharp disparities are rare and movements in the three exchange rate indices have subsequently shown only occasional small divergences. ✎