
For the record

September - December 1998

Information Release

2 October, 1998

In October 1998 the Bank issued two information releases on the Reserve Bank's trade weighted index (TWI) measure of the effective value of the New Zealand dollar. The first outlined proposed changes to the TWI, as the basis for consultation, and the second set out details of changes to be made, effective from 1 January 1999. Both releases are reproduced below.

Revisions to the Reserve Bank of New Zealand Trade Weighted Exchange Rate Index (TWI)

The Reserve Bank has undertaken a review of the Trade Weighted Index (TWI) it uses for summarising the effective value of the New Zealand dollar. As a result of this review, it proposes, commencing January 1 1999, to:

- (a) Substitute the euro for the Deutschmark in the TWI basket, but otherwise leave the currencies that comprise the basket unchanged. That is, the currencies will be the US Dollar, yen, euro, Australian dollar and pound sterling.
- (b) Adopt a new currency weighting methodology which takes account of:
 - New Zealand's import and export merchandise **trade** with each TWI country (as at present); and
 - the **GDP** of each country as a share of the aggregate GDP of the five TWI countries.

The 11 countries that initially will participate in EMU will be regarded as a single country.

A 50:50 weighting will be given to these trade and GDP weights.

The reasoning behind this change is elaborated on in an Information Release posted on the Reserve Bank's website (reproduced here).

October 1998

Background

The Reserve Bank has reviewed the way in which it constructs the Trade Weighted Index (TWI) used to measure the effective value of the New Zealand Dollar. The review has been undertaken against the background of:

- the commencement of stage 3 of European Monetary Union (EMU) on January 1 1999 and, with it, the inception of the euro as a new currency for the 11 initial participants in EMU;
- previous research focussed on the construction of a TWI that best explains inflation;
- acknowledgement that the present TWI does not include the currencies of non-Japan Asia;

Regard has also been had for the fact that TWI products (which reference the official TWI) are used in the financial markets. In revising the TWI, we have been concerned not to unnecessarily inhibit this business. However, the Reserve Bank continues to take no responsibility for any use made of the TWI by other parties. The Reserve Bank does not accept any liability in respect of any changes or developments affecting the TWI, whether those have been communicated or not.

Key considerations¹

The Euro

From January 1 1999, each of the national currencies of the 11 initial participants in EMU will irrevocably fix the value of their currency against each of the other participants and against the value of the new "Euroland"² currency, the euro. The euro is to be issued by the European Central Bank. This means that, in effect, the 11 countries will adopt a common currency and that their national currencies, which will remain circulating for a maximum of up to a further three and one half years, will become sub-units of the euro.

It is expected that the euro will rapidly be adopted as the currency in which Euroland commerce and trade is conducted and accordingly, that it should be represented in the TWI

¹ Further background on the issues discussed in this section is contained in (June 1997 Bulletin article, March 1998 Projections Box and August 1998 MPS Box)

basket from the outset. And given that Euroland will be a common market as well as a common currency area, there is a compelling case for giving the euro a Euroland weight in the TWI basket (rather than the weight for, say, just Germany, or a sub-set of the larger Euroland economies).

Trade weights

The currency weights used to calculate the TWI, since its inception, have been based on bilateral merchandise trade weights. Bilateral weights only reflect the importance of the producers in the trading partner country as competitors with New Zealand exports, and with producers of import substitutes in New Zealand. For example, if New Zealand is exporting refrigerators to Australia, the bilateral exchange rate only reflects New Zealand's competitiveness against Australian producers of refrigerators.

A more comprehensive approach to weighting other countries' currencies is required to take account of "third country competition". Third country competition refers to where, for example, the New Zealand exporter of refrigerators to Australia competes not just with Australian producers, but also the exports of refrigerators from other countries to Australia (eg United States built refrigerators). So when considering the currency weights that are relevant, account has to be taken of not just the Australian dollar, but also the currencies of those other countries that export to Australia, and their share of the Australian market. Generally it is large economies that are the most important "third country" competitors. Hence third country competition effects can be captured in an approximate manner by GDP weights.

The fact that a large part of New Zealand's external trade comprises trade in primary commodities also has a bearing on how to measure the effective value of the New Zealand dollar. Traders in primary commodities generally face a single world price, and it is the currencies of the countries that are the larger end-consumers that most influence the world price. Incorporating this analysis into the currency weighting calculations for New Zealand's primary commodity trade

results in larger weights for the currencies of the world's larger economies, notably the United States dollar.

For example, log prices are generally determined in the world market. If New Zealand has a large share of, say, the Korean log market and the Korean won depreciates, New Zealand does not become less price competitive in that market relative to other markets. If the logs can not be sold to Korea, they can be sold at the world price elsewhere.

How then does the Korean won matter for New Zealand's log trade? Changes to the value of the won will be important to New Zealand to the extent that (a) changes to the value of the Korean won affect Korea's demand for logs, and hence the **world price** for logs and (b) the importance of log exports in New Zealand's overall trade. Generally it is the world's large economies that tend to be the larger participants in the world commodity markets. Again, this suggests incorporating GDP shares into the currency weighting methodology.

The IMF calculates and publishes a TWI for IMF member countries using a methodology that formally incorporates bilateral and third country competition, and world-price primary commodity, considerations.

Previous research on the TWI as an explanation of inflation

Previous research undertaken inside and outside the Bank has suggested that the trade weights used to construct the TWI to date have not resulted in a TWI that best explains inflation developments. The results of two studies³ which took the existing five currency basket as a given, but searched for optimum weights to generate a TWI that best explained inflation, indicate:

- the USD and DMk should be assigned higher weights than the bilateral merchandise trade shares suggest; and,
- the AUD should be assigned a much reduced weight.

Convertibility of currencies

TWI products and positions are traded in the financial markets. This in part stems from the way in which the TWI, and more recently the Monetary Conditions Index (MCI), feature in monetary policy in New Zealand. That is, banks and their

² The Euroland countries are Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain.

customers have demonstrated an appetite for instruments and trades that enable them to take, or hedge, monetary policy positions. The Reserve Bank does not actively seek to promote such trading. But nor does it wish to inhibit trading of this sort if, amongst other things, it helps add liquidity to New Zealand financial markets.

It is recognised that including non-convertible currencies in the TWI basket would represent a material impediment to the trading of TWI products and positions. This suggests limiting the TWI basket to a small number of important international currencies.

However, the Reserve Bank continues to take no responsibility for any use made of the TWI by other parties. The Reserve Bank does not accept any liability in respect of any changes or developments affecting the TWI, whether those have been communicated or not.

Inflation rates

It is useful if the TWI currencies can be limited to those of countries with low inflation rates. Where this is the case, the nominal TWI can be used as a proxy for the real TWI, which matters most when assessing competitiveness.

Table 1 shows the recent average inflation rates for the set of countries whose currencies have been considered for inclusion in the new TWI. These have been higher for most of the non-Japan Asian countries than the other countries. And

those East Asian countries whose currencies have depreciated sharply will likely continue to experience higher inflation for a period. This means that their real exchange rates have not appreciated against the NZD by as much as their nominal exchange rates.

Geographical coverage

A number of observers have noted that the present TWI gives relatively little weight to New Zealand's trade with non-Japan Asia, despite China, Korea and Hong Kong, in particular being significant bilateral trading partners.

However, as outlined above, this bilateral trade is only one of many considerations when constructing an exchange rate index. Other considerations, in addition to those above, that have a bearing on whether or not to include a greater number of, and thus more East Asian, currencies in the TWI include:

- Whether the additional currencies that are candidates for inclusion are pegged or floating. At present, three of the currencies that would be candidates for inclusion based on trade weights (the Chinese yuan, Hong Kong dollar, and the Malaysian ringitt) are pegged to the USD. This does not, of itself, amount to a case for exclusion. But, it does suggest that an alternative way to take these currencies into account would be via assigning a larger weight to the USD.
- Whether or not they are freely convertible currencies.

Table 1: Average annual inflation rates 1993-1998

Non-Euro Countries		Euro Countries	
US	2.7	Austria	2.3
Japan	0.8	Belgium	2.0
Australia	2.1	Finland	1.2
UK	2.6	France	1.7
China*	13.1	Germany	2.4
Korea	5.2	Ireland	1.9
Taiwan	2.9	Italy	3.9
Malaysia*	3.8	Luxembourg	2.1
Hong Kong*	7.4	Netherlands	2.3
Singapore	2.1	Portugal	4.1
Canada	1.4	Spain	3.8
Saudi Arabia	1.6		
Thailand	5.3		
Indonesia	9.4		

* Currencies pegged to the USD

³ Rae D, (1994), "The exchange rate and inflation: are trade weights best?", *National Bank of New Zealand Financial Research Paper No 1*, July 1994 and Schoefisch U, (1990), "Exchange rate and foreign price indices: are trade weights appropriate?", *Reserve Bank of New Zealand Discussion Paper G90/4*, May 1990.

Table 2: Alternative weighting schemes (as at March 1998 quarter)⁴

	Current TWI	5 country			10 country		
		<i>Trade:</i> <i>GDP</i> 1/2:1/2	<i>Exports:</i> <i>Imports: GDP</i> 1/3:1/3:1/3	<i>Trade</i>	<i>Trade:</i> <i>GDP</i> 1/2:1/2	<i>Exports:</i> <i>Imports: GDP</i> 1/3:1/3:1/3	<i>Trade</i>
US	24.4	30.9	27.7	21.8	27.3	24.2	18.2
Japan	21.7	20.1	20.0	19.5	17.6	17.2	16.2
Australia	38.4	18.1	23.5	34.3	15.2	19.7	28.6
UK	9.7	7.5	7.9	8.6	6.5	6.8	7.2
Germany	5.9						
Euroland		23.4	20.8	15.7	20.8	18.2	13.1
China*					4.5	4.5	4.8
Korea					2.9	3.2	3.7
Taiwan					2.3	2.6	3.3
Malaysia*					1.5	1.9	2.6
Hong Kong*					1.5	1.8	2.2

*Currencies pegged to the USD

At present, neither the yuan nor ringitt are freely convertible. Including non-convertible currencies in the TWI would inhibit market trading of TWI products and of TWI positions.

Overall, it appears best to remain with only a few currencies once inflation rates, third country competition, primary commodity trade, and liquidity and convertibility considerations are taken into account.

The options

Table 2 sets out the main options that were assessed in the light of the above considerations. Five and 10 currency baskets were considered, with currency weights being determined in three different ways:

- bilateral merchandise trade weights (as the present TWI is calculated);
- a 50:50 combination of trade and GDP shares;
- a one-third each combination of merchandise import shares, merchandise export shares, and GDP shares.

The various weightings are compared in table 2.

The intuition behind using the GDP shares, in addition to trade shares, is that it gives larger countries a higher weight. This is consistent with accounting for third country competition and world-price commodity trade.

Figures 1 and 2 show how these different TWIs tracked since

the beginning of the 1990s. The 'euro' is included as a GDP-weighted average of the exchange rates of the 11 initial EMU participants. This assumes that the monetary policy of the European Central Bank, if it had been in existence, would have been a weighted average of the policies of the 11 national central banks. This is a reasonably accurate assumption only for the period since about end-1995, from when the cross rates of the 11 EMU currencies have been quite stable.

Points to be noted include that:

- Irrespective of which currency basket or weighting regime that is adopted, the effective value of the NZD during the 1990's follows a similar path;
- The alternatives which include an element of GDP-weighting show more trough to peak appreciation of the NZD between 1992 and 1997 and more depreciation from the early 1997 peak;
- Expanding the basket from 5 to 10 currencies generates TWI's that appreciate a little more from trough to peak, and depreciate a little less from the peak. However, the five additional currencies have a low weight, and thus make little difference to the path of the TWI.

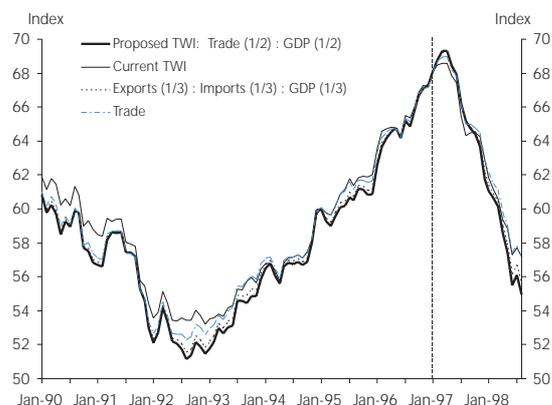
The preferred option

The Bank's conclusion is that the TWI from 1 January 1999 should:

- Comprise the currencies of the US, Japan, Australia, United Kingdom and "Euroland";

⁴ May not sum to 100 due to rounding.

Figure 1: 5 Currency TWIs with alternative weights



- Be based on currency weights derived from a 50:50 weighting of each country's share of New Zealand's merchandise trade, and their respective shares of GDP (with both the trade and GDP shares normalised to total 100%).

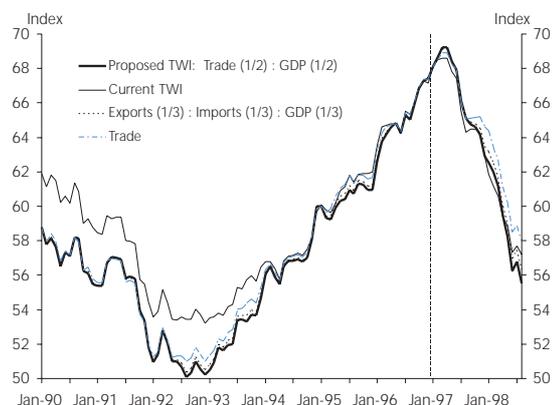
The reasons for preferring this particular option include that:

- It is simple and similar to the present TWI;
- The GDP shares proxy for third country competition and better account for primary commodity trade competitiveness;
- All five preferred currencies are freely convertible;
- All five currencies are those of low inflation countries;
- The weights derived broadly correspond with those suggested by previous research that has looked at which weights generate a TWI which best explains inflation;
- Expanding the basket to include 10 currencies makes little difference to the path of the TWI.

Table 3 (overleaf) compares the current TWI with the preferred five-country option and a 10-country comparison.

From the analysis, it is evident that there is more to the concept of an effective exchange rate than can readily be reflected in a single number generated by a simple formula. Hence, TWI values should be regarded as only approximations. The Bank intends to continue to publish research on exchange rate related issues, emphasising different facets of how exchange rates matter for the economy.

Figure 2: 10 Currency TWIs with alternative weights



Transition and housekeeping

Given that the euro will be a completely new currency, transitional arrangements will be required for the TWI. The following transition is envisaged:

- The Bank, on the first trading day of 1999, will calculate a value for the TWI on both the old (DMk inclusive) and new (Euro inclusive) basis.
- 8 The new TWI will, by definition, have an initial value of 100, but will be scaled to a value that corresponds with that for the current TWI (which has a 1979-base).
- The new TWI will be calculated initially on the basis of 1997 calendar year trade and GDP data.
 - GDP shares will be calculated on the basis of GDP measured in national currency units converted into either US dollars or SDRs. GDP may be converted into SDRs, rather than US dollars, to minimise changes to the GDP shares that stem solely from exchange rate changes.
 - The trade weights will be updated when calendar 1998 data becomes available and annually thereafter.

These details will be finalised and made public by end-October 1998.

Table 3: Summary Table: Weights⁵

	US	Japan	Australia	UK	Germany	Euroland
Proposed TWI ⁵	30.9	20.1	18.1	7.5		23.4
Current TWI ⁵	24.4	21.7	38.4	9.7	5.9	
Other TWIs						
Rae (1940)	37	23	19	10	11	
Schoefisch (1990)	31.1	29.4	13.2	11.8	14.5	

Revisions to the Reserve Bank of New Zealand Trade Weighted Exchange Rate Index (TWI)

30 October 1998

Change to the TWI

From 1 January 1999 the Trade Weighted Index (TWI) will:

- comprise the currencies of the US, Japan, Australia, United Kingdom and Euro countries. The Euro will be substituted for the Deutschmark in the current TWI basket;
- be 50:50 weighted on:
 - each currency-area's share of New Zealand's merchandise trade, normalised to total 100%; and
 - each currency-area's share of the 5-currency aggregate nominal GDP; ie weight currency_i = $\frac{\text{normalised trade weight}_i}{\text{normalised trade weight}_i + \text{relative GDP weight}_i}$

The reasoning behind these changes was elaborated on in a previous Reserve Bank Information Release dated 2 October 1998.

The new exchange rate will continue to be termed the TWI. GDP weights proxy for aspects of trade competitiveness and so a Trade Weighted Index is still appropriate.

Transition

Given that the Euro will be a completely new currency, the following transitional arrangements will take place:

- the Reserve Bank will calculate a value for the TWI on both the old (DM inclusive) and new (Euro inclusive) basis as at 1 January 1999;

- the new TWI will be scaled to a value that corresponds with that for the old TWI (which has a 1979 base);
- the new TWI will be released at 11 am on the first trading day of 1999 (5 January) via the usual electronic media.

Weights

The weights will be constructed as follows:

- the weights will be calculated initially on the basis of 1997 calendar year trade and GDP data;
- weights will be updated annually once all of the relevant data are available;
- merchandise trade data will be sourced from Statistics New Zealand (as at present);
- nominal GDP data will be sourced from International Financial Statistics (IFS), published by the International Monetary Fund;
- annual GDP shares will be calculated on the basis of GDP measured in national currency units converted into US dollars (using year average USD cross rates from IFS).

Weights will be released via the usual electronic media.

Historical series

As the Euro will not exist prior to 1 January 1999, the Reserve Bank will not release an historical series for the new TWI.

Further research

As with any index, there is more to the concept of an 'effective' exchange rate than can be captured by a simple TWI. Hence, the Reserve Bank will undertake to continue to investigate exchange rate issues, including alternative TWIs. Different TWIs emphasise the different facets of how exchange rates matter for the economy.

⁵ As at March 1998 quarter.