Alternative Measures of the Effects of Exchange Rate Movements on Competitiveness

In the past year there have been some sharp movements in exchange rates, involving substantial depreciation of a number of East Asian currencies and an appreciation of the US dollar against other major currencies. The Australian dollar has declined against the US dollar, but has appreciated substantially on average against the East Asian currencies.

The economic turmoil in East Asia will affect other economies in two ways. First, some of the contraction of demand and growth in East Asia will tend to spill over to other countries that export into the region. Second, the exchange rate movements that have taken place will have potential implications for prices and the international competitiveness of countries that trade with East Asia. This article focuses on the second of these issues, with a particular emphasis on the divergence in exchange rate movements over the past year.

The two standard indicators of the Australian dollar exchange rate are the bilateral rate against the US dollar and the trade-weighted index (TWI) (Graph 1). The simplest approach of focusing only on a single bilateral rate, such as the $US/$A rate, is often quite misleading. In the past year, the Australian dollar has depreciated against the US dollar by around 20 per cent, but this clearly overstates the extent of any overall depreciation because it is in large part a reflection of US dollar strength. The US dollar has been the strongest of the major world currencies over this period, rising in trade-weighted terms by over 10 per cent. In general, it is more useful to look at the exchange rate in terms of more broadly based measures that take a range of bilateral rates into account. The most commonly used measure, the TWI, has been relatively stable, with the depreciation against the US dollar (and, to a lesser extent, against other major currencies) being offset by large appreciations against the currencies of a number of important East Asian trading partners.

Other more specialised exchange-rate indices can also be constructed: for example, separate export- and import-weighted indices, or indices designed to reflect competition with third countries rather than just bilateral trade shares. In most circumstances, particularly

Graph 1

Graph 1: Exchange Rates, Daily. Index (LHS) showing TWI, and $US per $A (RHS), from 1995 to 1998.
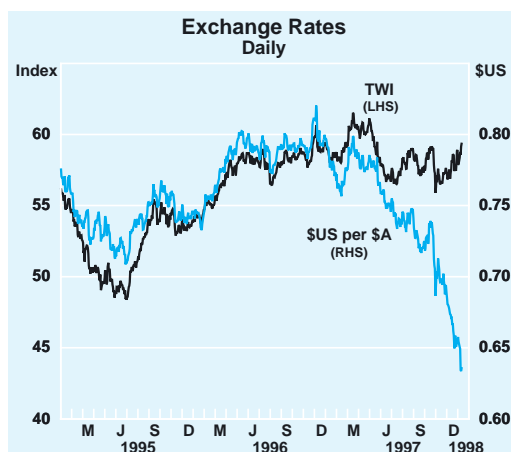
when the Australian dollar is moving in the same direction against most other currencies, the alternative exchange-rate indices tend to give much the same answer, and so it is reasonable to rely on the best known of them – the TWI. However, differences can become significant when there are sharp divergences between movements in the bilateral rates, as has been the case recently. In these conditions, any single indicator of exchange-rate competitiveness is likely to become less useful, and it becomes more important to look carefully at a range of alternative indicators.

There are several mechanisms by which bilateral exchange rate movements such as those seen recently might have significant economic effects that are not captured in the TWI. These include:

• divergences between export, import and aggregate trade-weighted exchange rates;

• the role of the US dollar as a currency of denomination in international trade;

• longer-term pricing of commodity exports in terms of the major world currencies; and

• the importance of bilateral exchange rates *vis-à-vis* competitor countries with whom we might have relatively little direct trade.

The discussion below analyses these issues and, in a number of instances, presents some alternative indicators of the effects of divergent exchange rate movements. The analysis suggests that, for a given level of the TWI, the recent combination of depreciation against the US dollar, and appreciation against the East Asian currencies, is equivalent to a modest net gain in Australia's average level of competitiveness.

Divergences between Export, Import and Aggregate Trade-weighted Exchange Rates

The weights used in construction of the TWI are averages of export and import weights. As a first step in looking at recent exchange rate movements it is useful to consider separately the behaviour of export- and import-weighted exchange-rate indices. In broad terms, the main difference between these weighting patterns is that an export-weighted index assigns relatively high weights to currencies of East Asian countries, reflecting their importance as export destinations, while an import-weighted index gives relatively high weights to the United States and Europe. A summary is presented in Table 1.

It is usually the case that fluctuations in these alternative exchange-rate indices are dominated by movements in the Australian dollar against the average of other currencies, rather than by relative movements of currencies within the trade-weighted basket.

Table 1: Trade Weights and Currency Movements Per cent			
	Export weight	**Import weight**	**Movement in Australian dollar since beginning of 1997**[a]
United States	7.9	24.3	-19.9
Japan	22.0	14.1	-8.4
ASEAN-4 and South Korea	22.4	10.7	88.1
Other East Asia	19.6	14.1	-10.3
European Union	10.4	23.6	-8.6
New Zealand	8.8	5.1	-0.2
Other	9.0	8.1	-12.3

(a) Increase indicates appreciation against the currency or currencies concerned

For this reason the indices move closely together for the majority of the time. However, the unusually large bilateral movements seen since mid 1997 have created a significant divergence between the export- and import-weighted indices (Graph 2). The combination of depreciation against the US dollar and appreciation against Asian currencies represents, at a given level of the TWI, a decline in the import-weighted index and a rise in the export-weighted index. In the period since mid 1997, the import-weighted index has declined by about 6 per cent relative to the TWI, while the export-weighted index has increased in relative terms by a similar amount.

The export- and import-weighted indices are relevant for different purposes. In assessing the impact of currency movements on *domestic prices*, it is mainly the import-weighted exchange rate that is relevant: it is likely to provide a better indicator than the TWI of import price pressures which form an important component of domestic inflation. At present this implies a somewhat stronger prospective import-price contribution to inflation than is obtained by looking at the TWI. In assessing the impact of currency movements on *prices received by exporters*, it is, in principle, an export-weighted measure that is most relevant. However, there are a number of grounds, discussed below, for focusing on broader measures of export competitiveness rather than the simple export-weighted exchange rate in this context. As indicated below, this suggests a somewhat different picture from the export-weighted index at present.

Currency Denomination of Trade Contracts

A factor that may have an important influence on trade prices in the short term, although not in the longer term, is the currency denomination of international trade. Contract prices are commonly set in US dollars, particularly in the Asia-Pacific region which accounts for the bulk of Australia's trade. In the short term – the period in which contracts cannot be renegotiated – this means that prices of traded goods and services are likely to remain stable in US dollar terms when exchange rates fluctuate. To the extent that this is the case, an Australian currency depreciation against the US dollar will, in the very short term, tend to raise both export and import prices in Australian dollar terms, regardless of movements in other exchange rates.

It is important, however, not to exaggerate the strength of this effect. Even in the short term, the effects of exchange rate fluctuations on exporters could be muted, since many exporters are likely to be hedged against foreign exchange risk, thereby effectively fixing the value of their export contracts in Australian dollars. In the longer term, contract prices can be renegotiated to take account of exchange rate changes, and there is no reason to think that the currency in which contracts are denominated will have any influence on the underlying supply and demand conditions that ultimately determine prices. (There are some other reasons, discussed below, to expect the US dollar to play a relatively strong role in international product markets, but these have nothing to do with the currency denomination of trade contracts.)

Graph 2

Exchange Rate Indices

*   Indexed to TWI on 2 January 1997
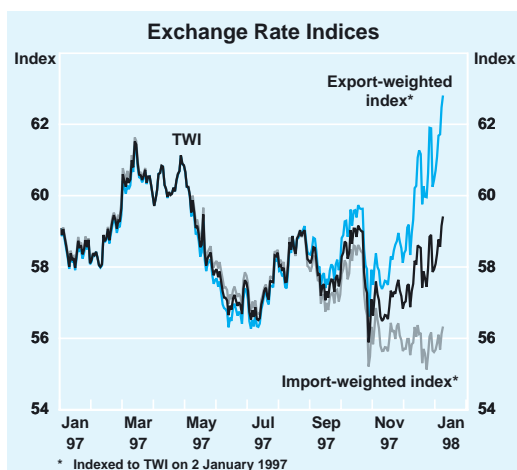
World Pricing of Commodity Exports

Putting aside the issue of short-term rigidity of contract prices, the longer-run effects of exchange rate movements on the Australian dollar prices of traded goods and services can be expected to vary significantly according to the nature of the good or service concerned. A significant proportion of Australia's exports is accounted for by agricultural or mineral commodities. These have the characteristic of being relatively homogeneous, and therefore tend to command fairly uniform prices in world markets. Australian producers of, say, zinc or copper, can generally sell their output at prevailing world prices. These are typically set in US dollars and, over the longer run, can be thought of as being determined in markets dominated by the major economies. Currency fluctuations among the smaller economies may have some effect on those prices, but when the group of currencies that are fluctuating most has a relatively small weight in world commodities demand, these effects are likely to be small. In current circumstances, this suggests that the Australian dollar prices of commodity exports are likely to be influenced most heavily by our exchange rates against the major world currencies, including the US dollar. A declining exchange rate in those terms tends to increase the Australian dollar prices received by commodity exporters, even though the Australian dollar is appreciating against the currencies of our other trading partners.

The general point can be illustrated by looking at the behaviour of Australia's commodity prices in terms of Australian and foreign currencies since early 1997 (Graph 3). In this period, world prices of Australia's commodities have fallen in international currency terms, whether measured in US dollars or SDRs. The TWI has shown little net change over the same period. Nonetheless, the decline in our exchange rate against the major world currencies has meant that commodity prices have increased significantly

in Australian dollars. The increase in the Australian dollar commodity price index of around 10 per cent over 1997 represents a net expansionary effect from the point of view of Australian commodity producers. The standard trade-weighted index, or even an export-weighted index, fails to capture this effect.

Graph 3

RBA Commodity Price Index
January 1995 = 100
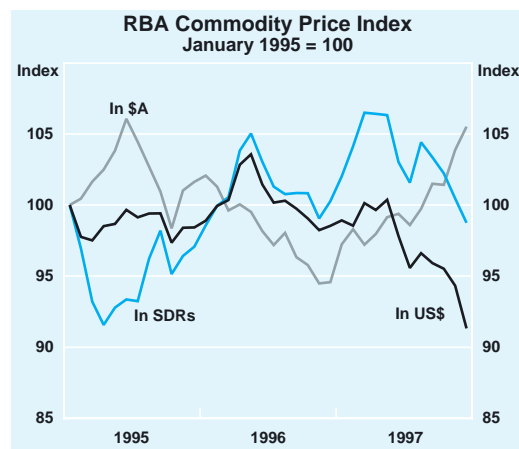
Many traded goods are not as standardised as commodities, and exporters of those products to countries whose currencies have depreciated are more likely to suffer price declines than is the case for commodity exporters. They will also gain price increases in countries with appreciating currencies. For these more differentiated products, the TWI may adequately summarise the average of these diverse price movements. Averaging across all exports, the mechanism discussed here suggests that exporters will tend to gain an aggregate net benefit from depreciation against the US dollar for a given level of the TWI, although this is not evenly distributed across the different categories of exports.

A Multilateral Competitiveness Index

Another consideration in the construction of summary indicators of exchange rate movements is the role of countries as

competing suppliers of goods in the markets to which Australia exports. The logic implicit in a trade-weighted index is that competition occurs mainly on a bilateral basis with each trading partner. Thus, if the Australian dollar appreciates against the Korean won, Australian producers of goods that are traded with Korea are said to have lost competitiveness against Korean producers. While that is true, it is not the whole story. Canada, for example, is also an important exporter to Korea of many of the products supplied by Australia. When the Australian dollar depreciates against the Canadian dollar (as it has quite substantially over the past six months), it means that Australian producers have *gained* competitiveness in the Korean market relative to producers in Canada. This may be the more relevant comparison if Korea does not have significant domestic production of the goods concerned.

Multilateral competitiveness indicators are designed to take account of these 'third-country' effects. They can be constructed as weighted averages of exchange rates where, in the case of Australia, the weights represent the market shares of Australia's main competitors in the markets to which we export. One such indicator is presented in Graph 4 (see the Statistical Appendix for details of the calculations).[1] The main difference between this 'third-country export-weighted' index and a conventional trade-weighted or export-weighted index is that it tends to place higher weights on countries with similar export composition to Australia, such as the United States, Canada and Brazil;[2] weights on countries with whom we have a lot of direct trade but which have very different export composition from Australia, notably the East Asian countries, are correspondingly lower. The implication of

Graph 4
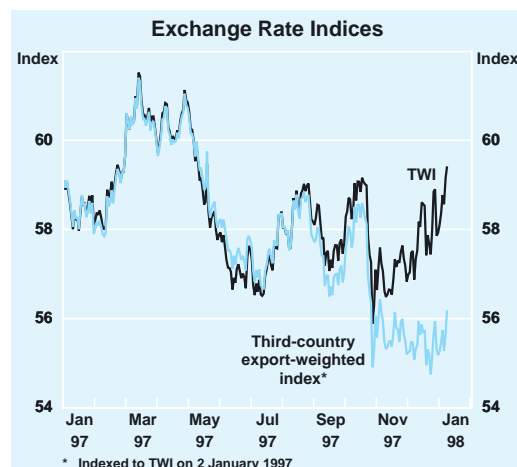
the higher weight assigned to dollar-bloc currencies in this index is that Australia appears to have gained competitiveness since early 1997 to a greater extent than indicated by the TWI. This is because the Australian dollar has depreciated against dollar-bloc currencies which represent our main export competitors. Relative to the TWI, the multilateral index suggests a gain in competitiveness of around 6 per cent over this period.

Conclusions

The exchange rate movements of the past year have occurred in the context of Asian economic turmoil that is widely expected to have a contractionary effect on the world economy. This article has not been addressed at assessing that broader impact, but has focused on measures of competitiveness that try to summarise the average direct effects of the divergent exchange rate changes on the

1. Other more sophisticated approaches than the one adopted here are also possible. Two examples are described by Durand, M. (1986), 'Method of Calculating Effective Exchange Rates and Indicators of Competitiveness', OECD Economics and Statistics Department Working Paper No. 29; and Artus, J.R. and A.K. McGuirk (1981), 'A Revised Version of the Multilateral Exchange Rate Model', IMF Staff Papers, 28(1), pp. 275–309.

2. Inclusion of Brazil does, however, distort the historical behaviour of this index because of Brazil's position, until recently, as a very high inflation country with a correspondingly high rate of currency depreciation. This is not an issue in the recent period as the Brazilian currency has been fixed against the US dollar.

Australian economy. The overall movement of the Australian dollar against these other currencies can be considered part of the Australian economy's response to the expected impact of the Asian turmoil.

There is no single ideal measure of exchange-rate competitiveness, and none of the measures discussed in this article can be taken as definitive. In normal circumstances, the TWI provides a useful summary but, in periods of sharp bilateral exchange rate movements such as have occurred recently, it is important to look behind the standard trade-weighted measure and consider a range of alternative indicators. The arguments that have been cited, and the various alternative measures constructed, generally point to the conclusion that the combination of depreciation against the US dollar and appreciation against East Asian currencies, at a given TWI, is equivalent to a modest net gain in international competitiveness. The net effect of these exchange rate movements to date on prices and economic activity is therefore likely to be moderately expansionary.

Statistical Appendix

The trade-weighted index

The TWI is a geometric average of bilateral exchange rates covering a sufficient number of trading partners to give at least 90 per cent coverage of Australia's two-way merchandise trade. Currently, this requires trade weights for 26 countries. The method used to calculate the trade-weighted index was described in the Reserve Bank *Bulletin* for October 1988. Weights are updated in October of each year and the current set of weights took effect from 1 October 1997. Table A1 presents the latest trade weights along with the export and import weights that underlie the data in Graph 2 of the main article.

The 'third-country export-weighted' index

The index presented in Graph 4 of the main article is an indicator of competitiveness that gives weight to countries according to their importance as exporters of the products that Australia exports, in the markets in which Australia is also an exporter. A decline in the index means that Australia's exports have, on average, become more competitive, relative to the exports of those other countries into the same markets. Details of the method of calculation of these weights are given by Jones, M.T. and J. Wilkinson, 'Real Exchange Rates and Australian Export Competitiveness', Reserve Bank of Australia Research Discussion Paper No. 9005. That paper provides weights based on 1987 trade data. Revised weights, calculated from United Nations Commodity Trade Statistics for 1994, are presented in Table A2. The data presented in Graph 4 are calculated using these revised weights.

Table A1: Trade Weights
Per cent

Currency	Trade weight	Export weight	Import weight
Japanese yen	17.9620	21.9533	14.1111
United States dollar	16.2446	7.8785	24.3163
New Zealand dollar	6.9162	8.8210	5.0785
South Korean won	6.7668	10.1805	3.4734
Chinese renminbi	5.4598	5.1138	5.7935
UK pound sterling	5.2845	3.3616	7.1396
New Taiwan dollar	4.3069	5.1695	3.4747
Singapore dollar	4.2186	4.8496	3.6098
German mark	3.9374	1.5094	6.2799
Indonesian rupiah	3.6225	4.7240	2.5599
Malaysian ringgit	2.9571	3.3202	2.6067
Hong Kong dollar	2.8021	4.4212	1.2400
Italian lira	2.5644	1.9293	3.1771
Thai baht	2.0273	2.4134	1.6547
French franc	1.9487	1.1410	2.7280
Canadian dollar	1.7124	1.6808	1.7429
PNG kina	1.6493	1.8136	1.4907
Indian rupee	1.4501	2.1292	0.7950
Swedish krona	1.2040	0.3142	2.0625
Belgian franc	1.1802	1.3181	1.0471
Philippine peso	1.0560	1.7479	0.3885
UAE dirham	1.0280	0.9496	1.1036
South African rand	1.0084	1.4480	0.5842
Netherlands guilder	0.9831	0.8340	1.1270
Saudi Arabian riyal	0.9158	0.6383	1.1835
Swiss franc	0.7938	0.3399	1.2317

Table A2: Third-country Export Weights
Per cent

United States	26.7	France	2.9
Japan	13.4	United Kingdom	2.9
Canada	7.6	Italy	2.5
China	5.9	Chile	1.6
Brazil	5.7	Netherlands	1.3
Germany	5.7	Hong Kong	0.9
Indonesia	4.8	Denmark	0.8
New Zealand	4.7	Ireland	0.6
Singapore	4.3	Norway	0.4
Belgium	3.7	Poland	0.4
South Korea	3.2		