The new sterling ERI

By Birone Lynch and Simon Whitaker of the Bank's Structural Economic Analysis Division.

This article explains proposals for a new sterling trade-weighted effective exchange rate index. The existing index is based on trade patterns in manufactured goods in 1989–91. The proposed new index would reflect more recent trade patterns, incorporate services trade and a broader set of countries, including those in Asia. We are inviting comments on the proposed method with a view to publishing the new index on a regular basis from Spring 2005.

Introduction

The Bank of England has traditionally used trade weights derived by the IMF to calculate and publish a sterling effective exchange rate index — the value of sterling against a basket of other currencies. These weights were last updated in 1995[1] and are based on trade patterns for manufactured goods in 1989–91. Inevitably, trade patterns change over time, and this article explains a new approach that the Bank of England intends to use to calculate sterling effective exchange rates. The key new features are: to update weights each year and therefore to produce an annually chain-linked index; for the country coverage to evolve over time based on changes in trade patterns; and to include trade in services.

The rest of this article is organised into four main sections. First, we explain the purpose of an effective exchange rate, and, second, we look at how that influences its design. Next, we explain the new features of the proposed index and examine the impact of the changes. Finally, there is a summary. We would like to invite comments on the proposed method before the Bank begins publishing the new index on a regular basis in Spring 2005.

What is an effective exchange rate?

The UK economy is affected by movements in sterling against many different currencies. Sterling's value against any one of these currencies is known as a bilateral exchange rate. An effective exchange rate index distils the information contained in bilateral exchange rates into one single series. And to construct an effective exchange rate index one first has to decide which bilateral exchange rates to include and, second, to decide how much importance to attach to each bilateral rate, ie the weight to attach to movements in each of the bilateral rates included in the index.

How should one weight together the different bilateral exchange rates? It all depends upon why the effective exchange rate is constructed. The proposed new Bank of England index — like the existing one — is designed to measure the influence of exchange rates on trade in UK goods and services. So the weights need to reflect the relative importance to the United Kingdom of different trading partners. Other types of effective exchange rates could be calculated for different purposes.

It is worth emphasising that, to assess changes in price competitiveness and hence trade volumes, we need to combine nominal exchange rate *and* relative price movements across different countries. In other words, we need to look at *real* trade-weighted effective exchange rates to capture changes in the price competitiveness of UK goods and services. Exchange rates are available at a much higher frequency, and are typically much more volatile, than aggregate prices for goods and services. So in the short run, in particular when they include countries with similar inflation rates, nominal effective exchange rates can act as a proxy for movements in real effective rates and hence competitiveness. But over longer periods of time, or when the set of countries includes those with very different inflation rates, looking at nominal effective exchange rates alone will give a distorted picture of competitiveness.

(1) See 'Revisions to the calculation of effective exchange rates' (1995), *Bank of England Quarterly Bulletin*, February, pages 24–25.

Designing a trade-weighted effective exchange rate index

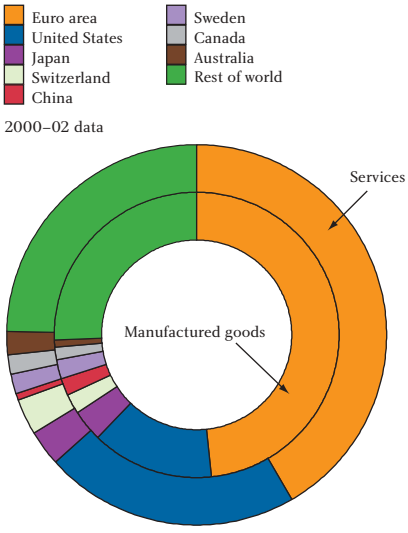
There are two key aspects to the design of a trade-weighted effective exchange rate: the type of trade included and the geographical spread of trade. This section discusses each of these in turn.

Types of trade included

There are three broad categories of trade flows: manufactured goods; commodities; and services. Traditionally, trade-weighted effective exchange rates have focused on manufactured goods and have excluded commodities and services. There are good reasons to exclude commodities trade. Commodities are largely homogeneous and so are priced in world auction markets based on global supply and demand. That means the country of origin or destination is relatively unimportant in determining how price-competitive the product is. Of course, in practice, it is difficult to know where precisely to draw the line between commodities and manufactured goods. The proposed index continues to exclude commodities trade based on standard international trade classifications.

Many tradable services are competing, differentiated products just like manufactured goods. But this type of trade has also traditionally been excluded from effective exchange rate calculations. This is because, in the past, the available trade flow information was insufficiently detailed for a wide enough range of countries. It is potentially important to include services trade where possible as the flows of trade between countries for manufactured goods are different to those for services.

Chart 1
Shares in UK trade in manufactured goods and services



For example for the United Kingdom, Chart 1 shows that the United States and other English-speaking countries are relatively more important trading partners for services than for manufactured goods. The United Kingdom does publish detailed information on its bilateral services trade flows, which the proposed new index includes. But it still will remain the case that, because comparable details are unavailable for many other countries, services trade is treated less comprehensively in the proposed index than trade in manufactured goods.

Geographical spread of trade

A comprehensive measure of competitiveness needs to take into account the different locations in which products compete. We illustrate this by looking at competition between the United Kingdom and Japan. First, UK products will compete with Japanese products in the United Kingdom via imports into the domestic UK market. We term this import competition. Second, UK products will compete with Japanese products in overseas markets. This consists of exports direct to Japan, which we will call bilateral export competition, and exports to the other markets to which the United Kingdom and Japan both export, which is called third-market competition. To get the overall competitiveness weight for a trading partner, the first step is to measure its relative importance to competition in each of these three locations.

Step one: analysing competition in different locations

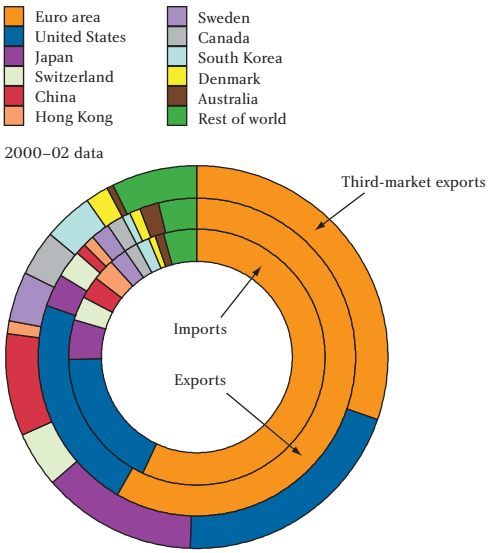
It is straightforward to calculate the importance, or weight, of each trading partner to the competition UK products face from *imports*. These weights are calculated from the share of imports from any one country —say Japan —in total UK imports. But working out the bilateral export competition and third-market weights assigned to individual countries is more complex.

The weight of a trading partner in *bilateral export competition* is not simply equal to its importance as a destination for UK exports. It is necessary to measure the share of UK exports going to that country *and* what proportion of that country's domestic market is supplied by domestic producers, rather than imports from the rest of the world. In other words, we need to know the country's degree of openness. To see this, suppose that country A and B both account for 50% of the United Kingdom's exports. In country A, the rest of its home market is supplied by domestic producers. But in

country B, domestic producers account for only a very small share of the home market, with most of the supply coming from imports from other countries. In this example, country A will be more important than country B as a direct bilateral export competitor to the United Kingdom.

The weight of a country in *third-market competition* represents the intensity of competition between that country and the United Kingdom outside their domestic markets. It is measured by multiplying that country's share in total supply in each third market by the relative importance of these markets as destinations for UK exports (see Appendix 1 for a more detailed explanation). Countries with which the United Kingdom has relatively little direct contact in its own or their domestic markets may be relatively more important as competitors in third markets in the rest of the world. For example, Chart 2 shows that South Korea, Japan and China are relatively more important as third-market competitors to the United Kingdom. But the euro area, a more closed area to trade, is more important as a direct competitor.

Chart 2
Import, export and third-market competition weights



Step two: aggregating across markets

We have described how to calculate the three types of weights that give the relative importance of each country to competition with the United Kingdom in each of the three locations. To calculate a total competitiveness weight for each country we need to aggregate these three according to the relative importance of the different locations of competition to all the markets in which the United Kingdom sells products. The relative importance of import, bilateral export, and third-market competition is represented by λ^M, λ^{BX}, λ^{TX} in the expression below. So the total competitiveness weight of a trading partner (W_i) is represented as follows:

$$W_i = \lambda^M MW_i + \lambda^{BX} BXW_i + \lambda^{TX} TXW_i \qquad \textbf{(1)}$$

where MW is its relative importance to competition in the UK home market from imports, BXW is its weight in bilateral export market competition, and TXW is its weight in third-market export competition. The location of competition weights (λ) sum to 1 and are fixed across all countries.

What determines the value of the λ weights? The weight on import competition (λ^M) indicates what proportion of the United Kingdom's total contact with trading partners across all markets takes place in the home market. This depends on what proportion of UK output is sold in the home market and how open the home market is to overseas producers. The weight on bilateral export competition (λ^{BX}) depends on the average degree of openness of the United Kingdom's trading partners, ie the extent to which they supply their home markets. The weight on third-market competition (λ^{TX}) is the average extent to which the United Kingdom's trading partners' home markets are supplied by third countries. Appendix 1 shows the algebra in detail. It turns out, as we show in the next section, that import and bilateral export competition are of approximately equal importance, with third-market competition considerably less important for the United Kingdom. So, on average, the United Kingdom mainly tends to compete with its trading partners in its own or their home markets rather than against them in the rest of the world. The box on page 432 illustrates the construction of total competitiveness weights for two countries with different characteristics.

To calculate all the necessary weights we need not only UK bilateral trade data, but also a matrix of trade flows for the whole world, and domestic production share data for all trading partners. This method was used by the IMF to construct the existing sterling ERI weights. The breadth of data needed to construct the trade weights is one reason why the IMF weights used in the current vintage of the ERI were based purely on manufactures trade in one particular period (1989–91) and have not been updated since. This means that the weights do not reflect recent changes in the importance of services

Examples of competitiveness weights

As an example of how the different components of competitiveness fit together, this box looks at the competition weights for Germany and China in the proposed new sterling ERI, estimated for 2002.

Location of competition	Importance of different locations of competition to the United Kingdom (λ)	Weight of country in each type of competition (per cent)	
		Germany	China
Import competition weight (MW)	0.44 (λ^M)	15.0 ($MW_{Germany}$)	3.3 (MW_{China})
Bilateral export competition weight (BXW)	0.44 (λ^{BX})	13.2 ($BXW_{Germany}$)	1.0 (BXW_{China})
Third-market export competition weight (TXW)	0.12 (λ^{TX})	7.6 ($TXW_{Germany}$)	10.2 (TXW_{China})
Total trade weight in sterling ERI			
($0.44 \times MW_i + 0.44 \times BXW_i + 0.12 \times TXW_i$)		13.3	3.1

Germany is most important to the United Kingdom as a competitor in the UK domestic market via imports and competition with Germany in third markets is relatively unimportant. By contrast, despite growing trade volumes between the United Kingdom and China, direct competition in either the UK home market via imports from China, or in the Chinese home market via UK exports to China, is relatively limited. Because China exports extensively to the rest of the world, competition with China in third markets is relatively more important. However, third-market competition accounts for a relatively small portion of the United Kingdom's overall contact with trading partners (12%), against 44% for each of the direct forms of competition. So China's high share of third-market competition does not have much influence on its total trade weight in the proposed new sterling ERI.

trade relative to trade in manufactured goods, nor the increase in trade with Asia.

The proposed new Bank of England approach

The key aim of the proposed new Bank of England index is to reflect trade flows accurately in the period of interest. This requires including services trade and having the flexibility to update the weights and the country set more frequently. Our analysis suggests that the hard-to-calculate elements of the IMF approach change relatively slowly over time or form a relatively small component of the overall competitiveness weights. So we propose to adopt three core elements from the IMF approach to use in our new index:

- the three location of competition (λ) weights;
- the third-market competition weights for each competitor (TXW); and
- the domestic production share adjustments to convert simple bilateral export market shares for each competitor into bilateral export market competition weights (BXW).

We take this information and combine it with much more readily available and easy-to-update UK bilateral trade share information to create an annually chain-linked index that includes services trade and has weights and a country set that varies over time according to the evolution of trade shares. The next section describes the construction of the index in detail.

Practical implementation of the new approach

The IMF has provided us with the λ weights from its current updating exercise[1] (based on 1999–2001 trade data) and those that underpin the current published set of weights (based on 1989–91 trade data). Table A indicates that import and total export market competition make approximately equal contributions to the total competitiveness weights for the United Kingdom and that these have not changed much over a ten-year period. So we propose simply to interpolate this information between 1990 and 2000 to get an annual series. Before and after these dates the λ weights are held fixed.

Table A
The IMF's location of competition (λ) weights for the United Kingdom

	1989–91	1999–2001
λ^M (import)	0.47	0.44
λ^{BX} (bilateral export)	0.38	0.44
λ^{TX} (third-market export)	0.14	0.12

(1) Bayoumi, T, Jaewoo, L and Jayanthi, S (2004).

For the third-market competition weights (*TXW*) for each competitor, we have taken those calculated by the IMF for 1999–2001 and projected them through time in line with competitors' shares in world trade. Table A indicates that third-market competition in aggregate accounts for less than 15% of the total competitiveness weight in both periods, and so approximations such as this should lead to limited loss of accuracy.

To convert simple bilateral export market shares of competitors (*BXS*) into the bilateral export market competition weights (*BXW*) we have used the IMF degree-of-openness adjustment factors for 1999–2001 for each country (γ_i) and held them constant over time. Like the location of competition (λ) weights this is a structural factor that changes only slowly.

Making these assumptions, we can update IMF-style aggregate competitiveness weights annually, based simply on the latest data on bilateral UK trade and competitors' shares in world trade. Overall competitiveness weights for each competitor (i) to the United Kingdom can be expressed as:

$$W_i^t = \lambda^{M,t} MW_i^t + \lambda^{BX,t} \gamma_i BXS_i^t + \lambda^{TX,t} TXW_i^t \qquad \textbf{(2)}$$

where most elements now change over time (t).

Because it is relatively simple to update these series we propose to:

- update the weights annually, calculating a chain-linked series instead of a fixed-weight series; and

- allow the country set to change over time according to trade shares — addressing the criticism that the existing ERI excludes trading partners that have become important recently.

We have also taken the opportunity to include services trade. The ONS publishes data for UK bilateral services trade flows in the *Pink Book* and these can be included in the ERI calculations. So the trade shares (*MW* and *BXS*) are based on data for trade in manufactured goods and services. No third-market weights are available as many countries do not publish detailed bilateral services trade data. But Table A indicated that this element of competition is relatively small.

The index must be spliced together at every period when the weights change. Otherwise, it would not be clear if the movement in the index represented changes in the bilateral exchange rates, or changes in the weights. The old and new weight indices are spliced together by calculating the index with new weights in the base and the current period.

Broadening the range of countries

In principle, all trading partners should be included in the index. There are, however, a number of practical reasons why that is not possible or desirable. First, trade data for developing countries are available on a less timely basis and are likely to be less reliable and only available over limited periods of time. Second, as the country set is broadened, those countries that have experienced very large depreciations are included, for example Turkey, Brazil and Russia. Their exchange rate movements are large enough to have a significant impact on the effective index despite their very small weight. But these depreciations have often been associated with periods of high inflation and so movements in the nominal effective exchange rate that includes these countries will be a relatively poor indicator of changes in the real exchange rate, or competitiveness. Real versions of the broader effective index that allowed for inflation developments would not be so affected. However, information on prices for some of these countries is less timely and reliable. In contrast, for industrialised countries with similar rates of inflation, movements in nominal effective exchange rates will not be a bad approximation to short-run movements in price competitiveness.

There will always be an element of judgement as to which country set to include. The proposal is to publish two main indices, a 'narrow' and a 'broad' index. This is similar to the practice of the Federal Reserve(1) and the European Central Bank.(2) The pool of countries included will evolve over time according to whether they account for more than 1.0% (narrow) and more than 0.5% (broad) of either UK imports or exports. Table B shows the additions to the existing ERI country set during 2000–02 resulting from adopting these threshold-based inclusion criteria. Of course, other narrower indices may be necessary for use in modelling trade flows where longer runs of price data are required which may not be available for developing countries.

(1) Leahy, P (1998).
(2) Buldorini, L, Makrydakis, S and Thimann, C (2002).

Table B
Additional countries in proposed ERIs(a)

1% based (narrow) index	0.5% based (broad) index
China	*1% countries plus:*
Hong Kong	Czech Republic
South Korea	India
Malaysia	Israel
Saudi Arabia	Philippines
Singapore	Poland
South Africa	Russia
Turkey	Thailand
Taiwan	

Note: Both proposed indices drop New Zealand, which is included in the existing published ERI.

(a) Based on inclusion of countries in any of the years 2000–02.

Revisions

With the annual chain-linking approach used here, we need to decide what vintage of trade data to use for the current set of weights. There is a trade-off between having the most recent trade patterns and the extent of regular revisions to the ERI weights that implies. The full year $n - 1$ trade data set only becomes available towards the end of year n with the publication of the *Pink Book* by the ONS. While ERI weights for year n are designed to be based on year $n - 1$ trade data, data from year $n - 2$ initially need to be used as a proxy in year n until full data for $n - 1$ become available. To reduce the frequency of revisions we propose to shift from weights based on $n - 2$ data to $n - 1$ at the end of year n. Trade shares evolve slowly so these revisions should be small.

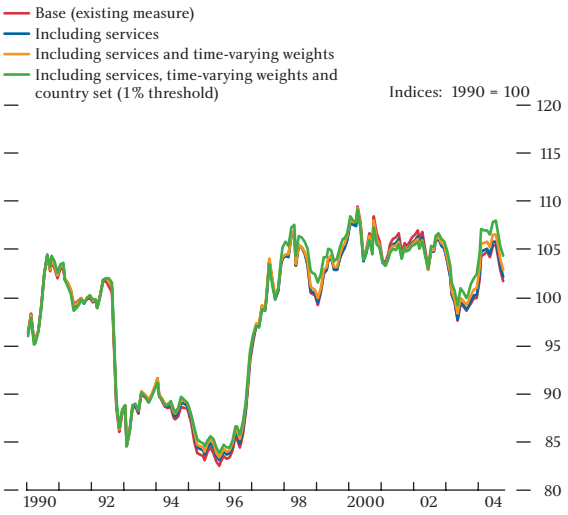
Every ten years or so, when the IMF updates its weights, new data will be available for interpolating the fixed elements of equation **(2)** (the λ and γ elements), potentially resulting in revisions to the previous ten years of data. Judging from the information we have to hand on how these have changed between 1989–91 and 1999–2001, these revisions should also be fairly small.

The impact of the proposed ERI features

The next section discusses the incremental effects, relative to the existing published sterling ERI, of each of the proposed changes to the method of calculation.

In order to create a base from which to judge the incremental effect of changes in method we need to re-create the weights from the existing technique using currently available data. This base calculation is shown by the red line in Chart 3. It is not identical to the published index because, for example, the trade data we have today will have been revised compared with the data available at the time the existing ERI weights were compiled by the IMF, though the differences are small.

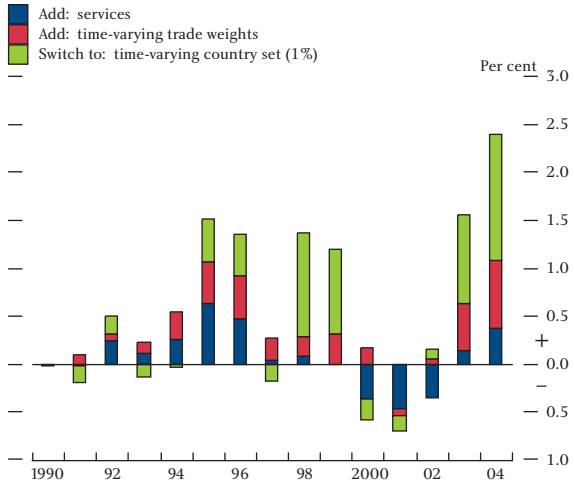
Chart 3
Sterling ERI levels(a)



(a) 2004 figures are to October.

Chart 3 also shows the levels of the ERI that follow from building in the new features. The first point to note is that, when looked at in the context of overall ERI movements over the past 15 years, the differences between the lines are relatively small. Chart 4 shows the percentage changes in the level resulting from introducing these changes in sequence. We next discuss each of these.

Chart 4
Sterling ERI changes(a)



(a) 2004 figures are to October.

Including services

We begin by including services. Compared to the base calculation, including bilateral services trade results in a reduction of the weight on the euro area (-3.2 percentage points — fairly broad-based across countries) and Japan (-0.4 percentage points). This is offset by a significant increase in the US

(+2.8 percentage points), Australian (+0.4 percentage points), and Canadian weights (+0.3 percentage points) — Appendix 2 provides further details. The small impact on the level of the index is shown by the blue bars in Chart 4.

Varying trade weights

The next step is to let the weights vary over time. Compared with the fixed-weights (using 1989–91 data) ERI discussed above, allowing the weights to vary gradually increases the US weight (by 0.8 percentage points in 1995, 2.6 percentage points in 1998 and 3.1 percentage points in 2002) and reduces the weight of Japan (by 1.4 percentage points and 2.2 percentage points in 1998 and 2002 respectively). The effect on the euro-area weight is typically a reduction of less than 1.5 percentage points, but the aggregate euro-area weight conceals a sharp fall between 1989–91 and 2002 in the weights of Germany (-3.1 percentage points), Italy (-0.8 percentage points), and the Netherlands (-0.4 percentage points), partially offset by increased weights on Spain (+1.8 percentage points), Ireland (+2.4 percentage points), and Belgium (+0.7 percentage points). Overall, introducing time-varying weights increases the level of the ERI by around 0.4% in 1995 and 1996, and by somewhat more in 2003 and 2004, but has little impact on other years (red bars in Chart 4).

Varying country set

We next let the country set vary over time. The fixed 20 country set included in the existing ERI was chosen in 1995.(1) A 1% of exports or imports threshold for inclusion results in a country set of 22–26 countries during 1989–2002,(2) with an average of 24. Table C compares the results of this process with the current ERI country set. A '1' represents an included country, and the table also gives the number of years between 1989 and 2002 in which each country is included.

Relative to the existing ERI, using a 1% threshold entails adding China (with a weight varying from 1.5% to 3.1%), Hong Kong (1.7% to 2.3%), Saudi Arabia (1.0% to 1.3%), Taiwan (1.1% to 1.4%) and South Africa (1.0% to 1.1%) for most of the 1989–2002 period, adding South Korea (1.3% to 1.5%), India (1.1% to 1.3%), and Malaysia (0.9% to 1.2%) sporadically, and Turkey (in 2002 only). China is included from 1994 onwards, Hong Kong for the whole period, while Saudi Arabia, Taiwan and South Africa drop out in the early 2000s. India is included for much of the early 1990s, Malaysia in the late 1990s, and South Korea from 1996 onwards.

Table C
Comparison of country sets

	Included			Number of years included	
	Current ERI	1.0% threshold	0.5% threshold	1.0%	0.5%
Australia	1	1	1	14	14
Austria	1	1	1	5	14
Belgium and Luxembourg	1	1	1	14	14
Brazil	0	0	1	0	3
Canada	1	1	1	14	14
China	0	1	1	9	12
Czech Republic	0	0	1	0	1
Denmark	1	1	1	13	14
Finland	1	1	1	12	14
France	1	1	1	14	14
Germany	1	1	1	14	14
Greece	1	1	1	4	14
Hong Kong	0	1	1	14	14
India	0	1	1	5	14
Indonesia	0	0	1	0	5
Ireland	1	1	1	14	14
Israel	0	0	1	0	13
Italy	1	1	1	14	14
Japan	1	1	1	14	14
Malaysia	0	1	1	4	14
Netherlands	1	1	1	14	14
New Zealand	1	0	0	0	0
Norway	1	1	1	14	14
Philippines	0	0	1	0	1
Poland	0	0	1	0	7
Portugal	1	1	1	14	14
Russia	0	0	1	0	7
Saudi Arabia	0	1	1	13	14
Singapore	0	1	1	12	14
South Africa	0	1	1	12	14
South Korea	0	1	1	7	14
Spain	1	1	1	14	14
Sweden	1	1	1	14	14
Switzerland	1	1	1	14	14
Taiwan	0	1	1	13	14
Thailand	0	0	1	0	12
Turkey	0	1	1	1	13
United States	1	1	1	14	14

The only country included in the existing ERI that does not feature in any year under a 1% rule is New Zealand, whose trade shares have typically been less than 0.5%. But Austria and Greece are included for only five and four years respectively. Denmark and Finland drop out for one and two years respectively.

Selecting the country set on a 1% rule adds 0.4% to the level of the ERI in the mid-1990s, increasing to 1.3% by October 2004 (green bars in Chart 4). The more marked appreciation since early 2003 mainly reflects the inclusion of China and Hong Kong. This analysis suggests that allowing the country set to change tends to have the most significant incremental effect.

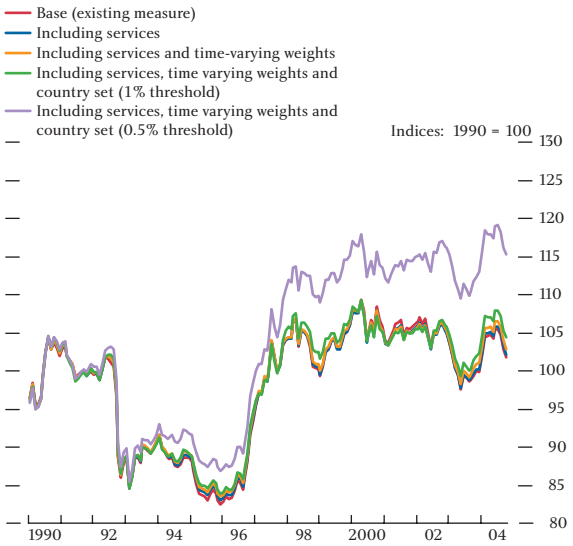
Expanding the country set

The 1% rule can be relaxed to yield a broader ERI measure with more countries. Table C, above, shows the

(1) Only countries that published unit labour cost data were included.
(2) Some of the euro-area countries have trade shares less than 1% but these have still been included.

effect of reducing the inclusion threshold to 0.5% on the country set. Turkey, Greece, Malaysia, Austria, India, South Korea, South Africa and China are included in the weights in several more years than was the case under the 1% rule. Israel, Thailand, Russia(1) and Poland are newly included in seven or more years, with Indonesia and Brazil appearing in a few years. Chart 5 below compares an ERI based on the 0.5% rule country set with the previous versions. The broad dollar effective exchange rate index published by the Federal Reserve uses a similar rule.

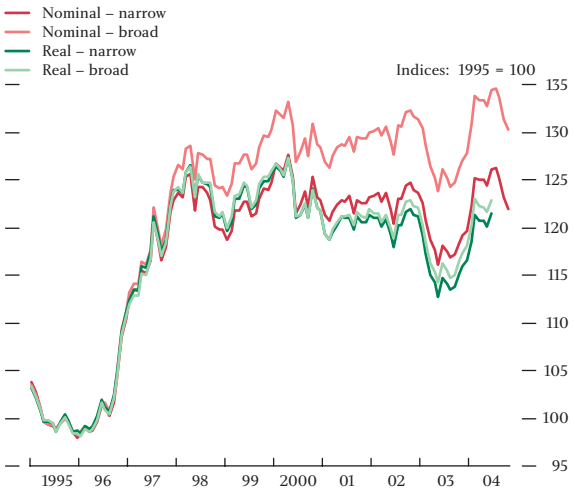
Chart 5
Broad and narrow nominal sterling ERI levels(a)



(a) 2004 figures are to October.

Chart 5 shows that the impact of this final change far exceeds any of the previous three changes. Because many of the newly included countries' nominal exchange rates have depreciated significantly, the resulting ERI is considerably higher. The levels of the 0.5% and 1.0% rule-based ERIs have diverged over time. In 1994 and 1998, however, the difference increased quite sharply — by 1½% and 2% respectively, compared with a trend average increase of around ¾% a year. In 1994 this relatively rapid widening of the wedge between the broader and narrower versions reflected depreciations of the Chinese yuan and Turkish lira.(2) In 1997 and 1998, it reflects the impact of emerging market currency crises, in particular depreciations in the currencies of Indonesia, India, Russia, Thailand, Turkey and Israel.(3) Traditionally, because these depreciations reflected very high inflation and other crises, broad indices like these have not been used for regular monitoring of competitiveness. We can, however, use consumer price data to calculate a real version of the broad and narrow indices and, as Chart 6 shows, the differences are as expected much smaller. Overall, the divergence of the broad and narrow nominal effective indices over time reflects the fact that inflation in the additional countries has been higher. There is sometimes a trade-off between trade coverage and data quality for ERIs. At the 0.5% cut-off level, countries may be included where only limited price and cost indicators are available, with a longer lag and subject to greater quality caveats, making measurement of real exchange rates and hence competitiveness less precise.

Chart 6
Nominal and real sterling ERI levels(a)



(a) 2004 figures for nominal are to October, for real they are to June. Real indices are calculated by combining exchange rates with relative consumer prices.

Charts 7 and 8 below show how the weights attributed to different regions have varied over time in the narrow and broad proposed indices. Both charts clearly show a trend increase in the weight attributed to Asia excluding Japan. But this weight drops between 2000 and 2002 in the narrow version, reflecting falls in the import and export shares of Malaysia, Singapore and Taiwan to just below the 1% threshold level, and consequent exclusion of these countries from the index in that year. That is related to the sharp slowdown in information, communications and technology trade volumes in that period.

(1) Non-availability of Russian/USSR rouble exchange rate data prior to 1992 has made it necessary to exclude the USSR from the calculations in 1989 and 1990 when it would otherwise have been included on the basis of trade shares.
(2) The Chinese yuan, with a 1.4% weight, depreciated by 34%, while the Turkish lira, with a 0.7% weight, depreciated by 64%. Neither currency was included for 1994 based on the 1% rule, so their full weight is relevant to the impact of switching to the 0.5% rule.
(3) These countries are singled out here because they are included in the 1998 weights under the 0.5% rule, but not under the 1% rule. Large depreciations in the currencies of South Korea, Malaysia, Taiwan and Australia did not contribute to widening of the gap because these countries are actually assigned smaller weights under the 0.5% rule.

Chart 7
Regional weights — narrow sterling ERI

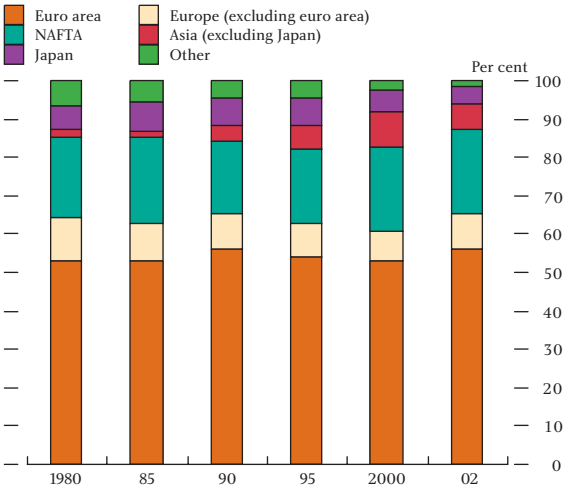
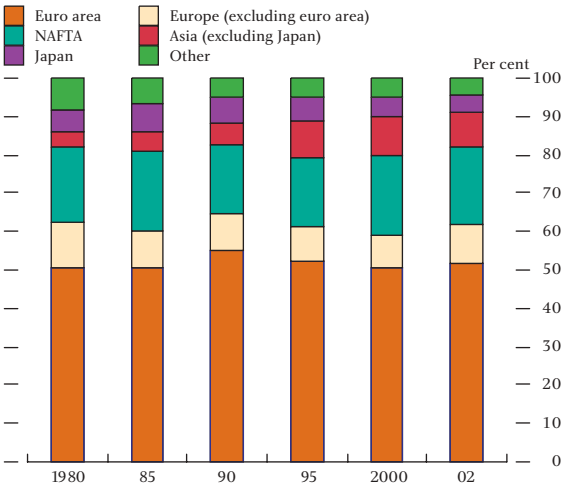


Chart 8
Regional weights — broad sterling ERI



Conclusion and next steps

Within the framework of the IMF method for trade-weighted effective exchange rates we plan to modify the existing sterling ERI weights to incorporate services trade, and allow the weights and country set to vary over time. We propose to update the weights annually to ensure that the competitiveness weights reflect recent patterns of trade. Table D below summarises how the method of the proposed Bank of England index compares with those produced by some other organisations.

Table D
Summary of characteristics of alternative ERIs

	Current IMF/Bank of England	Proposed Bank of England	ECB	Federal Reserve	Goldman Sachs	NIESR
Annual chain-linked	No	Yes	No	Yes	Yes	No
Includes services trade	No	Yes	No	No	No	Yes
Takes into account domestic production shares to weight the different types of competition	Yes	Yes	Yes	No	Partial	No

We believe the proposed method of calculating a trade-weighted effective exchange rate offers a reasonable compromise between being simple enough to allow regular updating and remaining close to the IMF method. Nevertheless, we recognise there are a range of possible alternative methods with differing degrees of complexity. We therefore invite comments prior to making a final decision on the new method to be employed. Once the consultation period has finished and a final decision on the method has been taken, we expect to publish the new sterling ERIs, in the same way as the existing ERI, beginning in the Spring of 2005.

The Bank also currently publishes ERIs for other countries on a daily basis.(1) The weights for these, just like for the existing sterling ERI, were calculated by the IMF. It would not be possible for the proposed new method for the sterling ERI to be applied to all these other countries (for example, because of lack of detailed bilateral services trade data). The alternatives would therefore be to cease publication of the other currency ERIs, or continue to publish them based on the current IMF trade weights, which will be updated by the IMF at some point. Some market participants have told us that they find the other 'Bank of England' ERIs useful, although ERIs for these countries are published by the relevant central banks, and market participants, often with more up-to-date weights. We would therefore also welcome comments about the usage of the non-sterling ERIs, published by the Bank, and on the potential usefulness of continuing to publish them using the existing IMF weights.

(1) Australia, Canada, Denmark, Japan, New Zealand, Norway, Sweden, Switzerland, United States and the euro area.

Appendix 1
The IMF ERI method

The IMF ERI weights are calculated as follows:(1)

$$W_{ij} = \lambda_i^M MW_{ij} + \lambda_i^{BX} BXW_{ij} + \lambda_i^{TX} TXW_{ij} \quad \textbf{(1)}$$

Where W_{ij} is the weight of country j in country i's ERI, MW_{ij} its weight in import competition, BXW_{ij} its weight in bilateral export market competition and TXW_{ij} its weight in third-market competition. These three types of competition are weighted together with the weights (λ) summing to 1. With s_i^k denoting country i's market share in market k, and w_i^k denoting the share of country i's output sold in market k, the components of this expression are derived as follows:

$$MW_{ij} = \frac{s_j^i}{\sum_{l \neq i} s_l^i} \quad \textbf{(A1)}$$

MW_{ij} is the share of country j in country i's imports. s_j^i is country j's share in country i's market. But country i's market includes domestic production. $\sum_{l \neq i} s_l^i$ is the sum of the market shares other than i in i's market, ie the share of imports in country i's market.

$$BXW_{ij} = \frac{w_i^j s_j^j}{\sum_{k \neq i} w_i^k s_k^k} \quad \textbf{(A2)}$$

By contrast BXW_{ij} is *not* simply the share of country j in country i's exports which would simply be $\frac{w_i^j}{\sum_{k \neq i} w_i^k}$: the share of country i's output sold in market j, divided by the share of exports in country i's total output, much as in equation **(A1)**. Before being used in equation **(A2)**, this simple share is scaled by $\frac{s_j^j \sum_{k \neq i} w_i^k}{\sum_{k \neq i} w_i^k s_k^k}$, which can be interpreted as a measure of the relative openness of country j. This is the openness adjustment coefficient referred to as γ in the main text. This is because s_j^j is country j's share in its own market — a measure of that country's openness — and $\frac{\sum_{k \neq i} w_i^k}{\sum_{k \neq i} w_i^k s_k^k}$ is the inverse of the average openness of country i's trading partners: s_k^k in each trading partner weighted by w_i^k — the share of country i's output sold in market k. So countries that are relatively open, ie their share of their own market s_j^j is small, tend to be less important for bilateral competition.

$$TXW_{ij} = \frac{\sum_{k \neq i,j} w_i^k s_j^k}{\sum_{k \neq i} w_i^k (1 - s_i^k - s_k^k)} \quad \textbf{(A3)}$$

The numerator of TXW_{ij} measures the competition between the exports of country i and j by multiplying country j's share of k's market (ie the competition from country j in that market) by market k's share in country i's output (ie the importance of country k to country i) — sometimes called double-export weights. The denominator is necessary because s_j^k is j's share of the whole of country k's market. But some of this is taken up by k's own production, and some by i's production. These need to be subtracted here because this is bilateral trade between k and i, which is taken care of in BXW_{ij}.

(1) For more details see Zanello and Desruelle (1997, page 29).

We now need to calculate the λ weights. All of these have the same denominator: $\sum_k w_i^k(1-s_i^k)$. This is the share of *i*'s output sold to country *k* times the share of *k*'s market accounted for by country *k* and third-country production summed across all countries. The intuition is that there is competition wherever country *i*'s products share a market with other countries' products, and this is more significant where the market accounts for more of *i*'s output or where the market is more open to producers other than *i*'s (giving consumers more scope to buy other country's products).

Considering the λ weights in turn, concentrating on the numerators:

$$\lambda_i^M = \frac{w_i^i(1-s_i^i)}{\sum_k w_i^k(1-s_i^k)} \qquad \textbf{(A4)}$$

The weight on imports is the share of *i*'s output sold in country *i*, multiplied by the foreign share of country *i*'s market. Country *i*'s products are more subject to competition with imports the more they are sold in the domestic market (by definition), or the more open this market is.

$$\lambda_i^{BX} = \frac{\sum_{k\neq i} w_i^k s_k^k}{\sum_k w_i^k(1-s_i^k)} \qquad \textbf{(A5)}$$

The weight on exports is the trade-weighted average of s_k^k — which is negatively related to the 'openness' of UK trading partners, as measured by the share of their market accounted for by their own production. The less open trading partners are on average, the more UK goods compete directly with their products (rather than with third-market output).

$$\lambda_i^{TX} = \frac{\sum_{k\neq i} w_i^k(1-s_i^k-s_k^k)}{\sum_k w_i^k(1-s_i^k)} \qquad \textbf{(A6)}$$

This is the trade-weighted average of $1 - s_i^k - s_k^k$: the share of country *k*'s market satisfied by third-market production (ie production of countries other than *i* and *k*). The more, on average, trading partners' markets are accounted for by the third-market products, the more UK goods compete with these.

Appendix 2
Comparison of ERI weights

Per cent

	Existing	Reconstructed base	Including services	Time-varying weights, fixed country set			Time-varying weights and country set (1% threshold)		
				1995	1998	2002	1995	1998	2002
Australia	0.48	1.03	1.41	1.42	1.47	1.39	1.32	1.35	1.31
Austria	1.19	1.05	1.03	0.90	0.96	1.07	0.00	0.87	0.99
Belgium and Luxembourg	5.39	5.98	5.33	5.66	5.59	6.03	5.25	5.08	5.61
Canada	1.38	1.62	1.95	1.77	1.90	2.12	1.60	1.68	1.93
China	0.00	0.00	0.00	0.00	0.00	0.00	1.60	1.79	3.08
Denmark	1.38	1.64	1.62	1.46	1.47	1.52	1.34	1.31	1.39
Finland	1.41	1.39	1.24	1.19	1.16	1.13	1.10	1.05	1.05
France	12.59	11.42	11.11	10.83	10.80	10.84	10.04	9.83	10.10
Germany	22.49	19.01	17.41	16.71	14.60	14.35	15.51	13.28	13.34
Greece	0.31	0.53	0.94	0.91	0.78	0.93	0.00	0.00	0.86
Hong Kong	0.00	0.00	0.00	0.00	0.00	0.00	1.93	1.95	1.87
India	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.00	0.00
Ireland	3.08	4.64	4.33	5.07	5.50	6.74	4.71	5.02	6.32
Italy	8.27	7.02	6.40	5.79	6.16	5.58	5.37	5.61	5.20
Japan	7.00	8.23	7.80	7.83	6.44	5.60	7.09	5.66	5.04
Malaysia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00
Netherlands	5.71	8.08	7.45	7.60	7.74	7.02	7.06	7.07	6.53
New Zealand	0.21	0.21	0.30	0.32	0.28	0.24	0.00	0.00	0.00
Norway	1.19	1.09	1.35	1.37	1.39	1.28	1.27	1.27	1.19
Portugal	0.84	1.15	1.23	1.18	1.22	1.02	1.09	1.11	0.95
Saudi Arabia	0.00	0.00	0.00	0.00	0.00	0.00	1.06	1.00	0.00
Singapore	0.00	0.00	0.00	0.00	0.00	0.00	1.55	1.26	0.00
South Africa	0.00	0.00	0.00	0.00	0.00	0.00	1.01	1.01	0.00
South Korea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.32	1.45
Spain	3.85	3.42	3.98	4.47	4.91	5.78	4.15	4.46	5.37
Sweden	3.45	3.53	3.32	3.15	3.04	2.39	2.88	2.71	2.18
Switzerland	3.27	3.37	3.40	3.18	3.64	3.47	2.89	3.25	3.18
Taiwan	0.00	0.00	0.00	0.00	0.00	0.00	1.23	1.17	0.00
Turkey	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08
United States	16.49	15.59	18.39	19.22	20.94	21.52	17.69	18.90	19.98
Euro area(1)	65.13	63.69	60.46	60.29	59.43	60.49	54.28	53.38	56.33

(1) Including Greece.

References

Bayoumi, T, Jaewoo, L and Jayanthi, S (2004), 'New rates for new weights', *IMF Working Paper*, forthcoming.

Buldorini, L, Makrydakis, S and Thimann, C (2002), 'The effective exchange rates of the euro', *European Central Bank Occasional Paper Series*, No. 2, February.

Goldman Sachs (2004), 'Updating the GS trade weighted indices', *Goldman Sachs Economic Research*, September.

Leahy, P (1998), 'New summary measures of the foreign exchange value of the dollar', *Federal Reserve Bulletin*, pages 811–18.

National Institute of Economic and Social Research (2004), *National Institute Economic Review*, No. 190, October, pages 38–39.

Zanello, A and Desruelle, D (1997), 'A primer on the IMF's information notice system', *IMF Working Paper WP/91/71*.

Data sources

UN Comtrade database
ONS (mainly *Pink Book*)
IMF International Financial Statistics, Direction of Trade Statistics
Taiwan Statistical Data Book

Contact details for comments

Please submit any comments by 31 January 2005 to:

Birone Lynch and Simon Whitaker
Structural Economic Analysis Division HO-3
Bank of England
Threadneedle Street
London
EC2R 8AH

birone.lynch@bankofengland.co.uk
simon.whitaker@bankofengland.co.uk