

Effective exchange rate calculations

This article argues that the methods used by the Central Bank of Iceland to calculate its published exchange rate indices (including the official effective exchange rate) do not fully serve their purpose, especially after the change in monetary policy framework in 2001. It proposes ideas for new indices based on methodology applied in the UK, US and elsewhere in recent years, using a more strictly rules-based selection of basket currencies. Inclusion in the index would depend upon fulfilling either a narrow or broader set of conditions. The narrow index would incorporate all countries accounting for 1% or more of Iceland's total foreign trade, and the broader one would have a threshold of 0.5%.

Purposes and viewpoints

The effective exchange rate is a key concept in economics. The nominal effective exchange rate expresses the price of the domestic currency relative to two or more foreign currencies, while the real effective exchange rate provides an indication of changes in competitive position between countries or currency areas. In both cases, the selection methodology and weights used to calculate the indices have a great effect on their usefulness. The Central Bank accordingly compiles three main indices: the official effective exchange rate and two real effective exchange rates based on consumer prices and unit labour costs respectively. A common feature of all these indices is that they are based on a basket specifying the reference currencies and the weight of each one. This article mainly focuses on the methodology used to determine the composition of currency baskets, i.e. how currencies are selected for inclusion and how individual weights are determined.

Currency baskets are not based on a single theoretical foundation and their underlying methodologies must reflect the importance of the role assigned to them, and the integrity of domestic and foreign data. Determination of exchange rate strategy will balance the exchange rate's twin functions as an instrument for macroeconomic adjustment and as an anchor of monetary policy. Whichever viewpoint prevails is then reflected in the weights in the index that is used as a reference for exchange rate policy. Countries where a fixed exchange rate regime provides an anchor for price developments tend to use hard currencies, i.e. from economies with a low and stable rate of inflation. Currencies of countries where there is price instability are therefore excluded from the index, even if considerable bilateral trade takes place. If the exchange rate is conceived as an instrument of adjustment, on the other hand, the broadest possible currency basket can be used so that the index will closely track changes in competitive position. Another important consideration when monetary policy is

1. The authors are economists at the Central Bank of Iceland's Economics Department. Part of the article is based on a report co-authored by them and Regína Bjarnadóttir and Arnór Sighvatsson, whom they thank for their cooperation. Thórarinn G. Pétursson is also thanked for his constructive remarks and Guðrún Sóley Gunnarsdóttir for her assistance. Any remaining errors are the sole responsibility of the present authors. The views presented in this article are those of the authors and do not necessarily reflect those of the Central Bank of Iceland.

anchored against an inflation target with a floating exchange rate is that changes in index values will give a clear picture of the impact that exchange rate movements have on prices, while whether or not the component currencies are hard is a secondary consideration.

Indices in Iceland and other countries

The following is a summary of the methodology used to calculate the currency basket for the Icelandic króna. A comparison is made with the methodologies used by Norway, Sweden, the UK, the US, New Zealand, the International Monetary Fund (IMF) and the Bank for International Settlements (BIS).

The Icelandic exchange rate index

The official exchange rate index which has been calculated in recent years comprises nine currencies and is based on separate weighted merchandise and services baskets. It is calculated as the geometric average of indices for the exchange rate of the nine currencies and is chain-linked.² The index is reweighted annually on the basis of the share accounted for by each country or currency area in Iceland's trade in merchandise and services over the previous calendar year. The weight between the merchandise and services indices in the total indices is determined by their respective shares in Iceland's total external trade.

The currency basket for the Icelandic króna is therefore calculated as follows:

$$W_{ij} = a_M W_{ij}(M) + a_S W_{ij}(S),$$

Where $W_{ij}(M)$ and $W_{ij}(S)$ are each country's respective weight in Iceland's trade in merchandise and services, and a_M and a_S the respective shares of merchandise and services in the total basket.

Merchandise trade figures are based on the geographical breakdown published by Statistics Iceland, while the breakdown of trade in services is estimated by the Central Bank as described below. Inclusion of currencies is not formally rules-based, but in principle the most important trading partner countries are selected. Their number has remained unchanged since 1995, apart from the reduction caused by the introduction of the euro.

All in all, a considerable amount of trade takes place with countries that are not directly taken into account in the basket. Two possible methods are available for reflecting this trade. Either these countries can be assigned a zero value and the weights of the other currencies left at their original share of the total, or the weights of the currencies outside the basket can be distributed among those in it on the basis of a rule. The latter option has been chosen for the Icelandic index, but not always applied using the same methodology. Merchandise trade with non-basket countries has been spread among four currencies – the US dollar, euro, yen and pound sterling – in the same proportions as their weight in the SDR. Trade with Eastern European EU ac-

2. For a more detailed discussion of the technical aspects and properties of indices based on arithmetic averages and chain-linking see e.g. Ellis (2001).

cession countries has been bracketed with the euro. These countries' combined share of Iceland's total trade is just under 5%. In effect, this approach tends to firm up the basket with harder currencies. Another justification for this methodology is that smaller countries tend to peg their currencies to a major one. However, the flotation of the króna (and many currencies that were once pegged) has undermined the arguments in favour of this approach. It probably biases the index towards the major currencies. If the purpose of the index is to give an accurate picture of the impact that exchange rate movements have on Iceland's competitive position and price level, this arrangement might be unsuitable, for example by causing the index to exaggerate the effect that the slide in the US dollar in recent years has had on the Icelandic economy.

Iceland's index also takes into account third-market effect and the export index is adjusted to eliminate it.³ However, the underlying calculations have not been updated since 1995. Only exports of marine products to main markets are adjusted for third-market effect. Information was collected from the main fish importers in Iceland's five main markets for marine products: the UK, US, France, Germany and Japan. Because neither price elasticity of demand in these markets nor price elasticity of supply from individual countries to them is known, a simplified rule for estimating third-market effect is applied. A competing country's share in the markets of main importers from Iceland is estimated and half of it is transferred from the importing country to the competitor. This implies that the supply and demand sides are treated equally, which may be justified by their elasticity of supply and demand being broadly the same. Market size is estimated in terms of fish consumption. While adjusting by relative consumption rather than supply may be a questionable choice, neither solution is necessarily better than the other.

Services trade estimates include data on transport and various business services, and a geographical breakdown of tourism sector data for currency transactions, payment card use, number of visitors to Iceland and nights of accommodation. Some figures involve more uncertainty than others, but payment card information is among the most reliable on both the income and the expenditure side. Currency transactions are disaggregated by country using trading system records, which is considered a fairly unreliable way of estimating both their scope and distribution. Most countries have therefore abandoned this approach in favour of survey-based collection of information.

IMF index

The IMF's index for Iceland is compiled from three separate indices for merchandise, services and commodities. Current basket composition is based on external trade over the period 1999-2001. Recently the methodology has been altered, especially for services calculations. Relative weights were previously estimated solely on the basis of manufacturing and services trade, adjusted for third-market effect.

3. "Third-market effect" refers to the impact on competitive position caused by trade between trading partner countries. For example, Norway is given increased weight because its marine products compete with Iceland's in European and other markets.

Services trade was originally estimated by redistributing tourism expenditures and revenues, but only to countries where this sector is an important component of total trade. The current index covers all trade in services, if known. Comprehensive data on bilateral trade in services is rarely available, except for tourism, where it can be proxied by data on tourist arrivals. Research does suggest that trade in services is determined by the same basic factors, such as distance, relative GDP and cultural links, that explain trade in manufactures. Accordingly, the IMF assumes that trade in services – except for tourism – is distributed along the same geographical lines as manufactures, and uses the same weights. For countries where tourism is a particularly important part of overall trade, separate weights are calculated for income and expenditure related to it.

Commodity trade is divided into twenty categories, each weighted as a homogeneous good with a single price. Total commodity weight is found by adding up the global importance of the country in different commodity trade, applying weights that capture the internal importance of each commodity for the country's trade. Trade in petroleum and oil products is excluded from calculations.

Manufactures trade weights consist of two effects: competition through imports of manufactures and through exports of such goods. Within exports, the weights reflect both direct competition with the producers in the destination country and (indirect) competition with them in third-country markets. The importance of the third-market effect is determined by the relative importance of imports of manufactures versus sales of home products of the destination country. Hence the weight is smaller the more closed the country.⁴

The IMF's exchange rate basket for each country is therefore calculated as follows:

$$W_{ij} = (a_M + a_S)W_{ji}(M) + a_C W_{ji}(C) + a_T W_{ji}(T),$$

where $W_{ji}(M)$, $W_{ji}(C)$ and $W_{ji}(T)$ are country weights for manufactures, commodities and tourism, and a_M , a_S , a_C and a_T denote the shares of manufactures, (non-tourism) services, commodities and tourism in overall trade.

The IMF's index weights for the króna diverge quite markedly from the Central Bank of Iceland's foreign exchange index, see Table 1.

The Central Bank currently weights the US dollar and euro considerably more than the IMF, but the yen less. Interestingly, this divergence occurs even though the methodology for calculating the two baskets is basically similar. Where the difference lies is in the services trade estimations and the exclusion of commodities trade from the Central Bank index. The IMF estimates geographical distribution of services exports solely on the basis of tourism data and assumes that other services than tourism resemble merchandise trade closely enough that no separate estimate is needed. The Icelandic index, on the other hand, uses currency transaction data to estimate non-tourist

4. Third-market effect calculations are discussed further in *New Rates from New Weights*, Annex 2, IMF.

Table 1

	<i>Central Bank of Iceland</i>	<i>IMF</i>	<i>BIS</i>
US	23.03	12.52	10.80
Canada	1.10	2.06	0.90
North America, other	0.00	0.51	0.00
North America	24.13	15.09	11.70
Euro area	41.14	31.64	40.40
UK	12.10	7.91	8.30
Denmark	8.13	6.83	6.70
Norway	6.04	4.58	3.80
Russia	0.00	0.56	1.10
Switzerland	1.21	1.04	2.00
Sweden	3.87	4.85	5.50
Europe, other	0.00	3.75	9.60
Europe	72.49	61.16	72.20
Japan	3.38	6.94	4.70
China	0.00	2.61	4.90
Asia, other	0.00	3.75	4.80
Asia	3.38	18.20	14.40
South America	0.00	0.00	1.10
Africa	0.00	1.68	0.20
Oceania	0.00	1.00	0.10

services. Compared with the IMF, Iceland's data shows a much higher level of services trade with the US than US services trade with Europe and Asia. Geographical factors may explain some of the difference, but not much. Revenues from the US military base at Keflavík have also boosted the US share, but these have been declining and explain only part of the difference – and will cease entirely this autumn. The US accounts for almost as large a share of Iceland's services trade as it does for Canada and Mexico, where it is the main trading partner country, sharing long borders and a free-trade agreement. These countries' high proportion of services trade with the US fits the hypothesis that merchandise and services trade generally follow the same geographical pattern, but Iceland is a case unto itself. The most probable explanation lies in the Central Bank's methodology for estimating geographical distribution of services trade in terms of vehicle currency rather than the actual trading partner country. As a result it increases the weight of the major currencies, in particular the US dollar, at the expense of others.⁵ The IMF basket for Iceland includes more currencies than the Central Bank, but ignores trade with the rest. This methodology increases the weight of Asian countries and also takes trade with China directly into account. It should also be borne in mind that the IMF basket is based on trade in the period 1999-2001, while Iceland's is revised annually on the basis of trade in the previous year.

BIS

BIS has regularly published real effective exchange rate indices for 27 currencies since 1993. Following a recent expansion and revision of the underlying baskets, BIS now calculates indices for 52 economies,

5. Services for the military base in Keflavík may tilt the US weight upwards. Less than 4% of export income has originated from the US base in recent years, however, so the impact on the currency basket is hardly more than 1½%.

including Iceland and the króna, accounting for 93% of world trade in 2004. Methodologies have been revised aimed at capturing global trade trends in recent years.⁶ Indices are based entirely on bilateral trade, but adjustment for third-market effect is made through a double-weighting approach. The methodology for calculating indices closely resembles that currently used by the Central Bank of Iceland. While the exclusion of services and commodities trade may be a shortcoming, it enables BIS to apply a harmonised methodology to all 52 currencies covered by the index, making it a useful tool for international comparisons.

Norway

Norway's trade-weighted index (TWI) comprises 15 currencies and is constructed on the basis of trade with its 25 main trading partner countries. These were increased from 18 in February 2000 in connection with the replacement of 11 currencies by the euro (Norges Bank 1999). At the same time the TWI was chain-linked, thereby preventing major changes in the index as a result of changes in the weights. It is based on OECD weights.⁷ Norges Bank also calculates an import-weighted exchange rate index for 44 economies. Its development shows that sharp fluctuations in relatively low-weighted countries can have a considerable impact on Norway's average exchange rate. The impact of Asian countries is particularly undervalued in the TWI. The 25 countries in the TWI accounted for almost 99% of total trade in 1970, but had shrunk to 89% in 1996. As well as incorporating more currencies, the Norwegian index differs from Iceland's in that it excludes services trade.

Sweden

Sweden has not revised its total competitiveness weights (TCW) index since the krona was floated on November 19, 1992. The TCW is based on average aggregated flows of manufactured goods for 21 countries, taking account of exports, imports and third-market effects. It was originally compiled by the IMF on the basis of international trade data for 1989-1991.

United Kingdom

The Bank of England recently revised the approach for calculating its exchange rate index (ERI), because its weights no longer reflected changes in the importance of services trade relative to trade in manufactured goods, nor the increase in trade with Asia. Previous sterling ERI weights were constructed by the IMF and based on manufacturing trade in 1989-91. In the new index, 15 currencies are now weighted instead of the former 6 and services trade is taken into account. Weights and country coverage are revised annually. A threshold for inclusion is set at 1% of total merchandise trade over the preceding

6. See Klau and Fung (2006).

7. The index is calculated in relation to exchange rates on the first business day in February (base rates). Until 2001, when Norway moved onto an inflation target, the base rates were revised annually and weights updated at the same time.

three years. The new index largely comprises countries with broadly the same rate of inflation as the UK. A broader index was also calculated with a threshold of 0.5% of total trade. Serving as an effective gauge of short-term competitive position, it includes several more volatile currencies of countries where inflation tends to rise in the wake of a depreciation and needs to be adjusted for, i.e. by calculating the real exchange rate, in order to evaluate long-term competitive position.⁸

United States

From 1971 to the end of 1998 the US Federal Reserve's index profiled the G-10 currencies. It was revised when the euro replaced five of the previous ten currencies, and also because of changes in US trade patterns (Leahy 1998). The single G-10 index was replaced by three: a broad index, major currency index and other important trading partner index. These incorporate third-market effects and the weights and country coverage are reviewed annually.

The *broad index* comprises economies whose bilateral shares of US merchandise imports or exports exceed 0.5%, i.e. trade in services is excluded. Country coverage and weights are revised annually.

The *major currency index* was designed to serve many of the same purposes that the G-10 index served. It not only measures the competitiveness of US goods relative to those of the major industrial countries, but also serves as a gauge of financial pressures on the dollar. As a consequence, the index includes currencies traded in deep and relatively liquid financial markets and for which short- and long-term interest rates are readily available. Currencies of trading partners with a history of high inflation relative to the US are excluded (Leahy 1998; Loretan 2005).

The *OITP index* captures movements of the dollar against the currencies of key US trading partners in Latin America, Asia, the Middle East and Eastern Europe. These currencies account for more than 40% of the weight in the broad index in recent years, providing important measures of the competitiveness of US goods in those regions and vice versa. Because some of these economies have experienced episodes of hyperinflation, the nominal OITP index is likely to be most useful in analysing shorter-term developments in dollar exchange rates. Methodology is under ongoing review, but no major overhauls have been made since its introduction (Loretan 2005).

European Central Bank (ECB)

The European Central Bank regularly calculates several indices for the euro. After an update of the underlying weights in 2004 (see ECB 2004a, 2004b) it currently publishes three indices, designated by the respective number of main trading partner countries that they include: *EER-12*, *EER-23* and *EER-42*. Inclusion is based on bilateral merchandise trade⁹ and minimum requirements for accessibility and reliability of statistical data. The methodology is based on the geometric weight-

8. For a more detailed description, see Lynch and Whitaker (2004).

9. Only manufacturing goods trading is taken into account, so that services and commodities are excluded from weight calculations. No threshold is set for share of total trade.

ing principle, applying the overall trade weights to the bilateral exchange rates of the euro against the currencies in each group, adjusted for third-market effects, using the methodology developed by BIS.¹⁰ The ECB assumes that the composition of foreign trade is inelastic and only updates the weights every five years, when the two periods are chain-linked. As well as nominal effective exchange rates, the ECB calculates real EERs for 23 and 42 countries deflated by consumer prices, producer prices, gross domestic product, unit labour costs in manufacturing and unit labour costs in the total economy (ECB 2004b).

New Zealand

In 1999, the Reserve Bank introduced a new method for calculating the effective exchange rate index for the New Zealand dollar. Replacing a fairly conventional methodology which was confined to bilateral merchandise trade, the new composition aims primarily to capture the impact of exchange rate movements on domestic prices. Currencies included in the trade-weighted index (TWI) cover New Zealand's five main trading partner areas, after the replacement of the Deutschmark with the euro (Hargreaves and White 1999). It was decided to keep the number of component currencies to a minimum, both for simplification's sake and because comparisons of larger baskets did not produce categorically better properties for explaining the impact of exchange rate movements on domestic inflation (White 1997). The main change was that the TWI weights the currencies partly on the basis of the size (GDP) of the trading partner's economy, and partly on their share of New Zealand's bilateral trade. This results in larger weights for the currencies of the world's larger economies, thereby indirectly allowing for the third-market effect and trade in primary commodities.¹¹

Summary

Design of exchange rate indices has changed markedly in most countries in recent years. The apparent trend is towards broader indices, partly to reflect their changed functions and new international trade patterns.¹² Keeping indices in pace with global trade developments is not always a majority priority. For example, Sweden has not changed its index weights since 1992 and they probably do not reflect its current external trade very closely. Norway's weights have been unchanged since 2001. None of the other countries discussed in this article uses the same methodology as the Central Bank of Iceland to adjust for services trade. Even the US Federal Reserve, which probably has more reliable information on trade in services than can be obtained in Iceland, does not do so. Besides Iceland, only the Bank of England fully incorporates the effects of trade in services, but uses a completely different method for estimating the data, through direct surveying of geographical distribution. Third-market effects are generally taken into account with the exception of Norway, and in Iceland they have not been regularly upgraded.

10. A more detailed description of the methodology is found in Buldorini *et al.* (2002).

11. For further discussion see RBNZ (1998).

12. This pattern is not universal, however, cf. the Reserve Bank of New Zealand methodology.

Both the Bank of England and the Federal Reserve have recently revised their methodologies, introducing broader indices and thresholds for inclusion of specific currencies. With ten fewer currencies in its basket, the Bank of England's rules are rather more stringent.

In practice Iceland's currency basket resembles the British one quite closely, because the threshold actually lies close to 1% despite the absence of a formal rule for inclusion. Setting a minimum for 1% of merchandise trade would see only Russia and China added to the basket. Scant information about services trade with these two countries, however, brings Russia's share of the total below 1%. Iceland's indices differ from all the others in one respect, however: trade with countries whose currencies are not included in the basket have no effect on its composition. A comparative overview is given in the table in the Appendix.

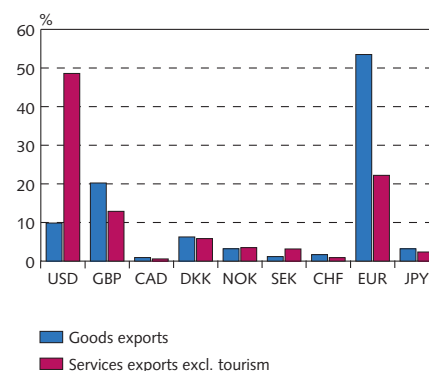
Estimating geographical distribution of trade in services

As pointed out above, some indices include trade in services and others do not. Even so, Iceland's methodology for estimating geographical distribution of trade in services in Iceland, on the basis of vehicle currency, is not used elsewhere. Hence there is reason to examine the effect that this methodology has on index composition. The IMF ventures that geographical distribution of services trade, excluding tourism, should closely match that of merchandise trade. Charts 1 and 2 compare these two aggregates for Iceland. They present a straightforward geographical breakdown of merchandise trade with countries in the index, irrespective of third-market effects or special adjustments for other countries.

The data used for calculating the breakdown of Iceland's trade in services appear to contradict the IMF's hypothesis. Services trade with the US far outstrips merchandise trade, while the opposite applies in the case of Europe. Iceland may in fact conduct rather more trade with the US than is the norm, because of the presence of the US-manned Iceland Defence Force, but given the size of business with the military, the difference can hardly be more than roughly 1½%-2% of the country's total international trade. A more likely culprit is the methodology for estimating geographical distribution. This point can be highlighted by comparing Iceland's services trade with the US and other countries. Chart 3 is based on bilateral trade data (excluding Iceland) collected from OECD surveys. Iceland's own estimate for distribution of trade is based on data from currency trading systems, plus the underlying data on tourism and transport as in the currency index.

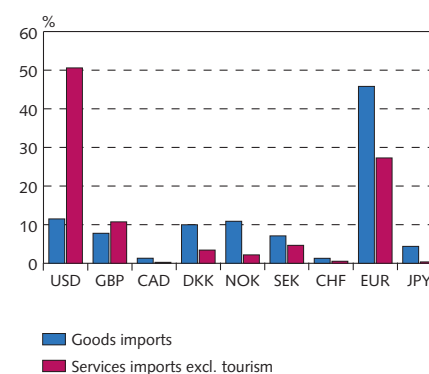
By international comparison, Iceland appears to conduct an exceptionally high level of services trade with the US. It ranks third after NAFTA members Mexico and Canada, which also conduct the bulk of their merchandise trade with the US. Iceland's geographical location is a dubious explanation for the services figure, since this would have an equal if not greater effect on merchandise trade. No other country displays such a wide discrepancy between the size of its merchandise and services trade with the US. The EU bloc comes next, if cross-border trade within the Community is excluded. The difference is less pro-

Chart 1
Respective exports of goods and services, excluding tourism¹



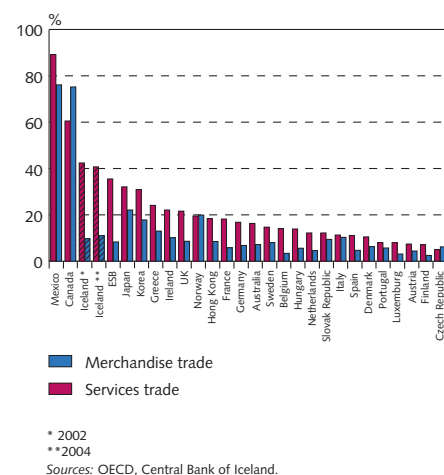
1. Based on external trade in 2004.
Source: Central Bank of Iceland.

Chart 2
Respective imports of goods and services, excluding tourism¹



1. Based on external trade in 2004.
Source: Central Bank of Iceland.

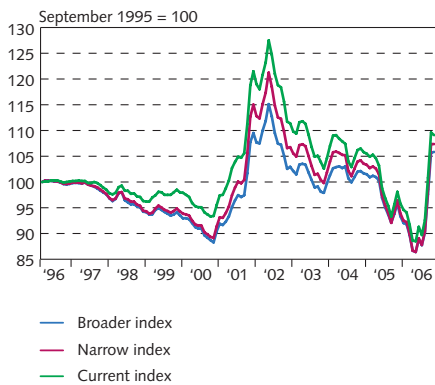
Chart 3
US share of selected countries' total trade 2002



* 2002
** 2004
Sources: OECD, Central Bank of Iceland.

Chart 4
Comparison of the current exchange rate index
and new exchange rate indices

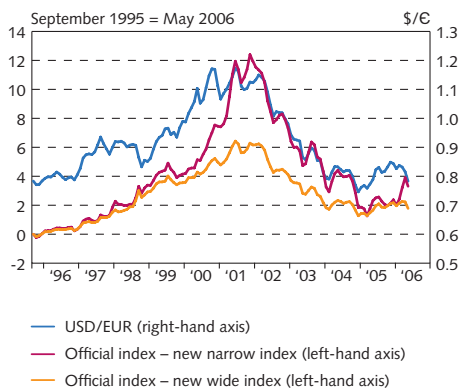
September 1995 - May 2006



Sources: Reuters EcoWin, Central Bank of Iceland.

Chart 5
Difference between indices for US dollar rates

September 1995 - May 2006



Sources: Reuters EcoWin, Central Bank of Iceland.

nounced for individual EU member states, although in most cases the US weighs heavier for services than for merchandise. All the same, the surveyed EU countries conduct much higher levels of trade in services with each other. Iceland is therefore distinguished not only by exceptionally large trade in services with the US both in volume and relative to merchandise trade, but also by its small services trade with the EU.

A probable explanation for Iceland's incongruity is that it presents the geographical distribution of trade by vehicle currency – it is well known that total trade in main global currencies far exceeds that of the countries of origin. This prompts the question whether the Central Bank of Iceland's methodology for geographical distribution is suitable or misleading. Currencies used in international trade do not necessarily reflect the underlying country of origin or destination. The weight of the dollar and, in recent years, the euro is likely to be greater if trade in them is measured. This may not matter if the index serves as an anchor for monetary policy, but the index is inappropriate if it is used to gauge competitive position or the effect of exchange rate movements on the price level.

How exchange rate developments are captured by new and earlier indices

Indices for the Icelandic króna have been calculated based on similar methodologies for country coverage to those now used in the UK and US.¹³ Two measures are used. The narrow index covers all countries accounting for more than 1% of Iceland's merchandise trade over a three-year period. For the broad index, the threshold is 0.5%.¹⁴ Indices have been calculated retrospectively to 1995. Based on a 1% entrance rule, Russia, Australia and Taiwan are added to the current index in 1995. China joins in 1999 and Estonia in 2002. Taiwan drops out again in 1999, Canada in 2003 and Australia in 2004. The broader index includes 14 extra countries at various times, and comprises a total of 19 currencies for 2005, instead of the present 9.

The new indices give a broadly unchanged overall picture of the development of the króna compared with those currently used. Over certain periods, however, a clear divergence is displayed. One explanation is that the US dollar has a much larger weight in the official index than in the new ones. As Chart 5 shows, the divergence correlates with the exchange rate of the dollar. In general, the new and old indices diverge the most with sharp movements in the dollar, which has a lower weight in the new indices. Nonetheless, other factors were clearly at work in the late 1990s, when the new indices show a considerably greater appreciation of the króna.¹⁵ During dollar depreciations

13. Indices were not adjusted for third-market effect. Although preferable, such estimates are technically difficult and judgement-based. The benefits are hardly sufficient to justify regular updating.

14. Merchandise trade with countries that are not included in the basket is excluded from the calculations, i.e. given a zero value. The previous methodology of attributing the share of trade with "outsiders" to the major currencies, i.e. according to their share in SDR, increased the weight of the hard currencies. This is pointless if the index does not serve as an anchor for a fixed exchange-rate regime.

15. To avoid the problem of frequent addition or removal of currencies to match annual fluctuations in trade, the entrance criterion is based on three-year average merchandise trade.

such as the present episode since 2002, the króna has appreciated more by the official index than the new ones.

A considerable difference is revealed between the narrow and broad indices in the first part of the current decade, apparently tracking fluctuations in the US dollar exchange rate but diminishing the more that the dollar depreciates and volatility abates. Naturally the extra currencies in the broad index do not weigh very heavily, but in the long run these indices will conceivably diverge more, for example if growing trade with emerging market economies results in more relatively volatile currencies being included.

Further revisions might be necessary

Since the purpose of the broad index is to measure Iceland's competitive position relative to main trading partner countries, it should preferably incorporate services trade, provided that reasonably reliable information about the composition is available. If the distribution of merchandise trade follows a similar pattern to services (excluding tourism), there may be reason to take tourism income and expenditures into account.¹⁶ For example, information is available about tourists' country of origin, destinations of Icelandic travellers and nights of accommodation, which could be incorporated as well. As described above, it may be advisable to calculate new indices which mirror the new economic climate more effectively. It is therefore proposed to calculate two new indices which will have different focuses and be updated more systematically than the current ones. A useful indicator for monetary policy implementation may also be provided by calculating an index specially designed to measure the impact of exchange rate movements on the price level. This is particularly apt in small, open economies such as Iceland, where exchange rate movements are likely to influence the general price level quite strongly. There are reasons for exploring in more detail how such an index can be developed for the Icelandic economy.

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16. See e.g. Bayoumi and Jayanthi (2005).

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Appendix

	<i>Calculated from:</i>	<i>Last change in methodology</i>	<i>No. of currencies in present basket</i>	<i>Revision frequency</i>	<i>Third- market effect</i>	<i>Other</i>
Iceland	Merchandise and services trade	1995	9	Annual (July)	Yes (last updated 1994)	Same currencies used, minor change to index
Norway	Merchandise trade	2000	15	Unchanged since 2001	...	Based on OECD trade weights
Sweden	Merchandise trade and tourism	1992	10	Unchanged since 1992	Yes	IMF weights based on data from 1989-1999
UK	Merchandise and services trade	2005	15	Annual (spring)	Yes	1% of imports or exports
US						
– Broad index	Merchandise trade	2003	26	Annual	Yes	0.5% of imports or exports
– MCI	Merchandise trade	2003	7	Annual	Yes	Major currencies
– OITP index	Merchandise trade	2003	19	Annual	Yes	Countries in broad index but not in MCI
IMF	Merchandise trade and tourism	2001	...	Irregular, 10 years before last revision	Yes	
New Zealand	Merchandise trade	1999	6	Annual	Yes	Weights country's GDP with share of bilateral trade
BIS	Merchandise trade	2006	52	Irregular, last 2006	Yes	Covers 93% of total global trade

