Appendix 5

The real exchange rate of the króna in a historical and international context

The impact of the exchange rate of the króna permeates the whole Icelandic economy. It directly affects the prices of imported and exported goods and services, the combined value of which has amounted to 75-80% of GDP in recent years. The real exchange rate may be defined as the change in domestic price level or unit labour costs relative to trading partner countries, from a given base year and measured in the same currency.[1] Generally the real exchange rate is shown as an index. An appreciation of the real exchange rate of the króna implies that the domestic price level or unit labour costs have risen more than in trading partner countries, after adjustment for exchange rate changes, i.e. it represents deterioration in the competitive position of domestic businesses. Businesses in the traded goods sector need either to raise the prices of their products or accept lower profit margins. In the former case the result is a loss of market share to foreign competitors, and in the latter case lower profits relative to foreign producers which weakens Iceland's competitive position in the long run.

Real exchange rates are closely linked to the hypothesis of purchasing power parity (PPP), which in effect is the law of one price – one of the key laws of economics – in the context of international trade. According to the hypothesis, real exchange rate volatility should only be small and short-lived, because in an environment of free trade and competition, it is not sustainable for the same good to be sold at different prices in different countries. In the long run price differences between countries, measured in the same currency, ought to be levelled out, since otherwise unlimited arbitrage would be possible. In practice, transport costs, trade restrictions and other business costs make it unrealistic to expect perfect PPP to be established. A more realistic approach is to adopt a relativist version of the hypothesis which states that there is a direct connection between price changes in different countries after allowing for exchange rate changes, transport costs, business costs, trade barriers, differences in taxation of goods and services between countries and other factors that explain "normal" international price differences. However, even this weaker hypothesis is at odds with empirical evidence. The real exchange rate of most countries has been highly volatile. In some cases the trend even appears to be persistent, which contradicts the PPP hypothesis but can be explained with the so-called Balassa-Samuelsson effect (see below).

1. The real exchange rate is sometimes also explained as relative prices of non-traded and traded goods.

Most economists nonetheless believe that the PPP hypothesis is valid in the long run, as shown by a long-term mean reversion tendency, even though the deviation from the equilibrium real exchange rate (long-term equilibrium) is both large and persistent.

The Icelandic króna has appreciated sharply in real terms from its historical low towards the end of 2001. So far this year, relative consumer prices are roughly 20% higher than in Q4/2001 and relative unit labour costs (RULC) 28% higher. This increase has driven the real exchange rate 18% above the ten-year average and close to the peak reached in the 1980s. A number of reasons underlie the stronger real exchange rate in recent years. Unlike earlier episodes, it is primarily driven by an appreciation of the nominal exchange rate of the króna. Investments in the aluminium and energy sectors and the rise in the Central Bank's policy interest rate have played a substantial part, while in recent months buoyant external demand, which is reflected in higher export prices, may also be expected to have contributed. Besides a higher nominal exchange rate, inflation and wage increases in Iceland have also exceeded those in main trading partner countries. If forecasts hold, consumer prices will have risen by 14% in Iceland since 2001, compared with 6.5% in trading partner countries. However, increases in productivity have countered the impact that higher wage costs have had on the real exchange rate based on RULC. Productivity increased by 12% in Iceland over the period in question, but by 6% in trading partner countries. Measured in these terms, the real exchange rate has not strengthened as much, even though wage rises have outstripped those in trading partner countries by 13.5 percentage points.

It can be argued that greater productivity in the traded goods sector is a permanent change which may cause equilibrium to be established at higher relative prices than before.[2] Such a real exchange rate trend, often associated with Balassa and Samuelsson, is caused by much slower productivity changes in the non-traded goods sector in the absence of foreign competition. If growing prosperity causes a relative expansion in the non-traded services sector which increases its weight in private consumption and the CPI, a marked trend may be reflected in real exchange rate time series based on them. However, such appreciation need not imply a change in the competitive position.

Increased productivity in the traded goods sector may have caused some increase in the equilibrium real exchange rate of the króna, but is highly unlikely to have driven it up to its present level. The wide current account deficit indicates that the real exchange rate is unlikely to be sustainable from a macroeconomic balance approach.[3] Hence, the króna may be expected to depreciate again in nominal and real terms when the capital inflow needed to fund such a wide current account deficit begins to dwindle. Given the

2. The term "traded goods sector" is used here of both exports and import-competing goods and services. In other literature it is often confined to the latter.

3. Another concept for examining the equilibrium real exchange rate is the macroeconomic balance approach. This defines the equilibrium real exchange rate as the simultaneous attainment of external balance (a sustainable current account balance) and internal balance (a level of employment compatible with a steady rate of inflation). Different equilibrium real exchange rate concepts are discussed in Sighvatsson (2000).

macroeconomic shocks that Iceland will undergo over the next few years, the adjustment is much more likely to take place through a lower nominal exchange rate than with a soft landing which would involve a long episode of lower domestic inflation and labour cost increases than among trading partner countries.

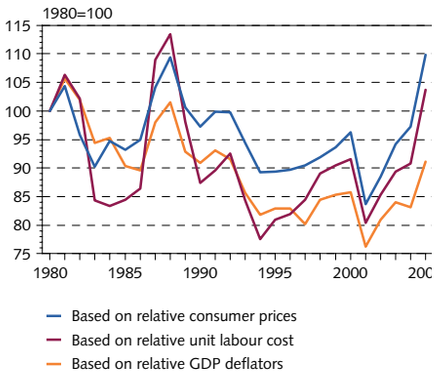
Three real exchange rate indices have been regularly calculated in Iceland. While they display broadly the same long-term trend, deviations occur in certain periods. Relative consumer prices and unit labour costs have been mentioned above. The third index uses the GDP deflator instead of the CPI. Each measure has its pros and cons. GDP prices have a certain advantage in being a broader measure than the CPI. They incorporate all domestically produced and imported goods and services. However, when calculated in these terms the real exchange rate can be misleading as a gauge of the competitive position, because it fails to distinguish between relative costs or prices and the terms of trade. Since foreign trade tends to be specialised, based on relative efficiency, the components measured by GDP indices are not comparable. For example, prices of marine products weigh heavily in GDP in Iceland but not among trading partner countries. A rise in marine prices, which should imply an improvement in the terms of trade, drives up GDP prices in Iceland and thereby the real exchange rate. Thus the competitive position appears to have deteriorated although it need not have changed for fisheries sector companies at least or may even have improved. Chart 1 shows that, despite differences in methodology and this drawback, the real exchange rate deflated by GDP prices yields a similar result to relative consumer prices.

The real exchange rate relative to unit labour costs is affected by changes not only in wages and the exchange rate, but also in productivity. It differs from the other indices by not being directly linked with the PPP hypothesis. This makes it less suitable for examining the equilibrium real exchange rate in a long-term context. Changes in RULC provide an indicator of the profitability and competitive position of businesses. In 2004, the real exchange rate measured in these terms was broadly the same as the average for 1999 and 2000, but 7% higher than the ten-year average and 2% higher than the twenty-year average. Assuming that the króna remains stable for the rest of this year and wages develop in line with the Central Bank's forecast, the real exchange rate based on RULC in 2005 will be 19% above the ten-year average and almost 15% above the twenty-year average.

Chart 1 shows the development of these three real exchange rate indices for the króna over the period 1980-2006. All of them display marked volatility. The chart shows that the real exchange rate was considerably lower on all three counts in 2001 and 2002 than at any other time over the period since 1980. If the króna remains at its present strength throughout 2005, the real exchange rate will be broadly the same as the peak in 1988 relative to the CPI, but somewhat lower on the other indices.[4] An obvious comparison for the real exchange rate at present is the historical average over recent

Chart 1

Three measures of real exchange rate
1980-2005

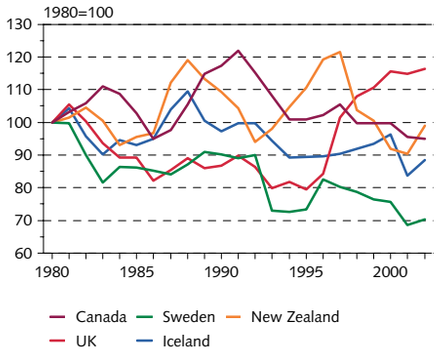


Source: Central Bank of Iceland.

Chart 2

Real exchange rate fluctuations in selected countries 1980-2002

Based on relative consumer prices



Source: Central Bank of Iceland.

4. However, so far this year the real exchange rate based relative consumer prices has been 5% lower than the peak in Q1/1988.

years and previous peaks, but it is not certain that they provide a totally accurate indication of probable adjustments towards long-term equilibrium. It can be argued that the equilibrium exchange rate dropped as a result of the widespread abolition of trade barriers in the 1990s, which dampened its volatility by causing a relative contraction in the non-traded goods sector.[5,6] Increased net national debt may also have driven down the equilibrium exchange rate. On the other hand, export growth prospects and high returns on foreign investments are said to have caused the equilibrium real exchange rate to rise. In practice, it is difficult to pinpoint anything definitive.

Given the scale on which the real exchange rate has risen, people have naturally wondered whether this situation is normal or whether Iceland's real exchange rate volatility is more than in other countries. Chart 2 shows real exchange rate fluctuations in several countries which, like Iceland, are on an inflation target. The real exchange rate has been fairly volatile in most of them. Table 1 shows the highest and lowest index values for the real exchange rate in selected countries over the past 25 years (1980 = 100). The European countries in the sample have witnessed wider fluctuations than Iceland over this period, while in Canada and New Zealand they have been similar.

Table 1 Highest and lowest real exchange rates in selected countries since 1980

Country	*Highest value*	*Lowest value*	*Difference (%)*	*Standard deviation (%)*	*Exports imports as % of GDP*
Austria	106	70	52	11	105
Canada	122	95	28	7	80
Iceland	109	84	31	6	80
New Zealand	121	90	34	9	60
Norway	156	100	56	14	70
Sweden	100	69	46	9	85
Switzerland	158	100	58	16	85
UK	116	80	46	12	55
USA	131	73	79	18	25

Sources: IMF (IFS), EcoWin, websites of various central banks and Central Bank of Iceland.

The widest range between highs and lows in the real exchange rate is in the US. Given the relatively low importance of foreign trade for the US economy, however (see Table 1), fluctuations in the dollar exchange rate have a far softer impact on its households and businesses, most of which produce solely for the domestic market.

References:

Bravo-Ortega, C. and J. J. di Giovanni, (2005), Remoteness and Real Exchange Rate Volatility, *IMF Working Paper*, WP/05/1.

Sighvatsson, Arnór (2000), Jafnvægisraungengi krónunnar: Er það til? [Equilibrium exchange rate of the króna – does it exist?*] Fjármálatíðindi*, vol. 47, pp. 5-22.

5. Assuming that trade barriers in Iceland were greater than among main trading partner countries.

6. Recently, two economists at the IMF published a paper where they examined the impact of trade costs on real exchange rate volatility. Their paper shows that higher trade costs result in a larger non-tradeable sector and this, in turn, leads to higher real exchange rate volatility, Bravo-Ortega and di Giovanni (2005).