Box II-1

Terms of trade and real exchange rate

Terms of trade are the ratio of export prices to import prices, and they measure how much can be obtained in imports per unit of exports. Terms of trade are generally presented as an index based on a given base year and therefore show the proportional change in the price of exports and imports. The real exchange rate, on the other hand, measures domestic costs as a proportion of foreign costs in the same currency. It is most common to measure the real exchange rate based on consumer goods prices. If exported goods prices were the same as the price of consumer goods, and if the price of imports were the same prices of consumer goods in Iceland's main trading partner countries, measured in krónur, developments in terms of trade would be exactly the same as developments in the real exchange rate. To some extent, there is a tendency for these two variables to move together, but there are also forces that pull them in different directions. The composition of exports is very unlike the composition of consumer products in Iceland. The difference in the composition of imports to Iceland and the composition of consumption in Iceland's main trading partners is less pronounced, but nonetheless considerable.

Developments in terms of trade and real exchange rate

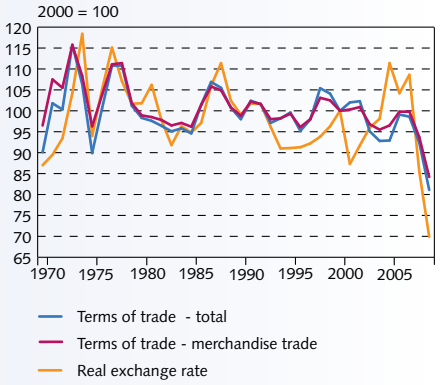
Chart 1 illustrates developments in terms of trade and the real exchange rate from 1970 to 2009. The chart shows that, in the first part of that period, there was a close relationship between terms of trade for goods and the real exchange rate. During the period 1971-1989, the correlation between changes in these variables was measured at 0.66, while the correlation during the period 1971-2009 measured 0.55. From 1990-2009, however, the correlation is much less, or 0.34. The significant decrease in both variables in one year, 2009, has a marked effect on the measured correlation. During the period 1990-2008, the correlation is practically non-existent. If changes in Iceland's terms of trade for both goods and services are examined, the correlation with changes in the real exchange rate still exists but is not as strong. To some degree, this reflects the fact that services are priced more in accordance with domestic cost conditions than most exported products are.

The correlation between changes in terms of trade and changes in real exchange rate in the first half of the period reflects, on the one hand, the importance of the fishing industry in the export of goods at that time, and on the other, the then-current Government's policy of lowering the real exchange rate when terms of trade in the fishing industry deteriorated and then allowing increases in marine products prices to raise the general domestic price level, thereby raising the real exchange rate as well. From 1990 onwards, this relationship became much weaker than it had been before that time. It can also be assumed that increased exchange rate volatility after the króna was floated early this century reflects, to some degree, increased real exchange rate volatility without a corresponding increase in volatility in terms of trade. Chart 1 shows that, if the marked decline in terms of trade in 2009 is excluded, fluctuations in terms of trade were less pronounced after 1980 than in the 1970s. In 2009, global prices of aluminium and marine products fell sharply, and domestic prices fell at the same time due to a decline in the domestic cost level. The decline in the domestic cost level led to a sharp drop in the price of services and other exports where pricing is based on the domestic cost level and therefore the real exchange rate. The price of aluminium and marine products, however, is determined by conditions on foreign markets, and normal changes in domestic costs have a negligible effect on production.

As Chart 2 shows, changes in the price of marine products strongly influenced terms of trade, particularly early on. It can also be seen clearly that changes in marine product prices were in line with changes in commodity prices for most of the period, while

Chart 1

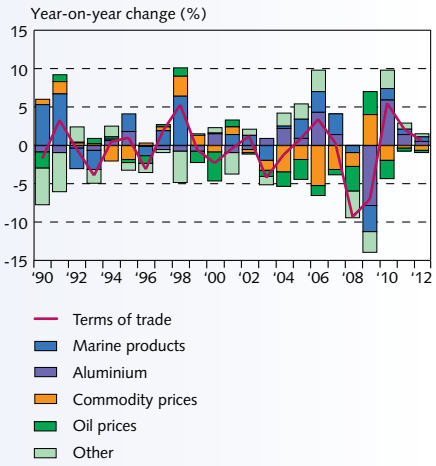
Terms of trade and real exchange rate 1970-2009



Sources: Statistics Iceland, Central Bank of Iceland.

Chart 2

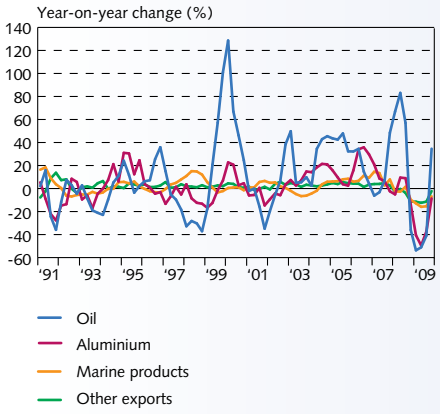
Terms of trade and their main components 1990-2012[1]



1. Central Bank baseline forecast 2009 - 2012. The contribution of the main sub-indices to year-on-year changes in terms of trade is determined by weighting the annual change in the sub-index concerned together with its weight in the import or export of goods and services. The item "other" is a residual.

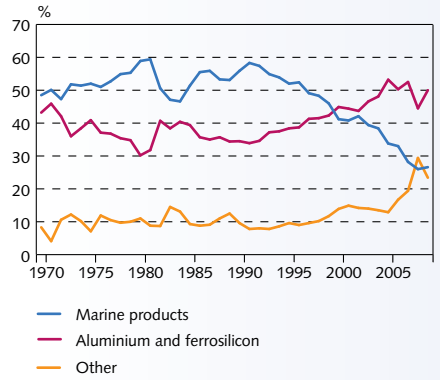
Sources: Statistics Iceland, Central Bank of Iceland.

Chart 3
Prices in foreign currency
Q1/1991 - Q4/2009



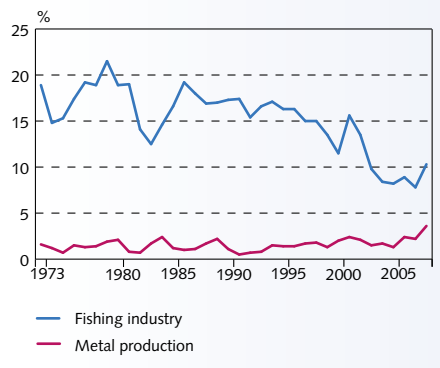
Sources: IMF, Statistics Iceland.

Chart 4
Proportion of exports 1970-2009



Source: Statistics Iceland.

Chart 5
Share of gross factor income 1973-2008



Source: Statistics Iceland.

for the past 6-7 years, marine products prices have changed in line with changes in the composition of marine exports. In recent years, fluctuations in terms of trade have been determined more by fluctuations in the price of aluminium and commodities.

Dissimilar fluctuations in the price of major product categories

Chart 3 shows developments in the price of Iceland's main exports and in global oil prices. Oil and aluminium prices are in US dollars, while the price of marine products and other exports (mainly services) are in foreign currency at the average exchange rate. The chart shows that the prices of various products move very differently from one another. The price of petroleum products fluctuates most by far, and aluminium prices fluctuate somewhat less, although more than the price of marine products. The price of exports other than aluminium and marine products – mostly services – fluctuates the least by far. As in Chart 2, it can be seen that the significant deterioration in terms of trade in 2009 was caused by an unusually marked decline in the price of aluminium and marine products. This decline began to reverse near the end of 2009, when aluminium and marine product prices began to recover. That trend has continued in 2010.

The impact on overall terms of trade

The effect of price volatility in individual product categories on fluctuations in terms of trade is determined by the weight of the product category concerned in exports and imports, the correlation between price volatility in that category and other product categories, and the size of the price fluctuations in the category in question. A stronger correlation between price changes in individual product categories tends to magnify fluctuations in the price of total exports. The correlation between year-on-year changes in the price of aluminium and marine products measured 0.34 during the period 1991-2009, but slightly less than 0.1 if the measurement extends only through 2008.[1]

In addition to the correlation, the weight of individual product categories is an important factor. Other things being equal, increased weight in sectors with more pronounced price volatility will mean that export prices will be more volatile overall. Chart 4 shows the weight of individual product categories in total exports. It can be seen there that the fishing industry's share has diminished gradually from nearly 60% of total exports around 1990 to the current level of just below 30%. Over the same period, the share of energy-intensive industry – primarily aluminium, but ferrosilicon as well – grew from 10% of total exports to nearly 30% in 2008, before pulling back to just over 23% in 2009. Although the value of aluminium exports is now similar to that of marine products, there is still a substantial difference in the net contribution from the two sectors; i.e., their contribution after deducting input costs from export revenues. This contribution is measured in terms of the output of the sectors or their gross factor income. Chart 5 shows developments in gross factor income in the fishing industry, on the one hand, and in energy-intensive industry, on the other. The chart shows that, by this criterion, the weight of the fishing industry was nearly three times that of the energy-intensive industry sector in 2008. This explains in part why terms of trade have not fluctuated more than they actually have in spite of the rising importance of aluminium as an export product. Imports of alumina and other inputs for aluminium production have also risen considerably, and price changes for these products closely follow changes in aluminium prices. The effect of these fluctuations on terms of trade is therefore determined more by the weight of aluminium in gross factor income than its weight in exports.

1. Magnús F. Gudmundsson discussed the macroeconomic risk of increased weight of aluminium in exports in "The aluminium industry and export revenue volatility," in *Monetary Bulletin* 2003/3.