

According to preliminary figures from Statistics Iceland, Iceland's terms of trade improved by 6.8% in 2015, after having improved by 3.3% in 2014. This significant improvement means that Iceland's economic prosperity is growing somewhat more than is reflected in recent robust GDP growth figures. This Box discusses this development and places it in context with the recent interaction between wage rises and inflation.

Terms of trade have improved markedly in the past two years ...

Terms of trade measure the price Icelanders receive for their exports relative to the price of goods and services imported to Iceland. Terms of trade therefore improve, for instance, when export prices rise and when import prices decline. The past two years' 10% improvement in terms of trade stems from a nearly 1% increase in export prices in krónur terms, coupled with a nearly 9% reduction in local currency import prices. The most important contributor is the decline in global oil and commodity prices, although the nearly 20% increase in the foreign currency price of marine products is a factor as well.¹ This rise in the relative price of exports means that it is possible to buy more imports for a given volume of exports; i.e., the purchasing power of Icelandic exports has increased. This can be seen in Chart 1, which shows that the purchasing power of exports rose by 15.5% in 2015 and nearly 23% in 2014 and 2015 combined. At the same time, export volumes have risen by a total of 11.5%.

... generating a positive terms of trade effect not seen since the 1970s

One way to estimate the impact of improved terms of trade on the economy is to measure the so-called terms of trade effect, which compares the purchasing power of exports with export volumes and expresses the difference as a percentage of the previous year's GDP.² As Chart 2 indicates, the terms of trade effect was positive by 3.9% of GDP in 2015, and by a total of 5.8% in the past two years combined. The last time Iceland experienced such a strongly positive terms of trade effect over a two-year period was in the mid-1970s. On the other hand, the current upsurge comes in the wake of an almost uninterrupted deterioration in terms of trade since 2007, which generated a negative terms of trade effect totalling over 9% of GDP. As a result, there is quite a bit of ground to cover before terms of trade return to the pre-crisis level.

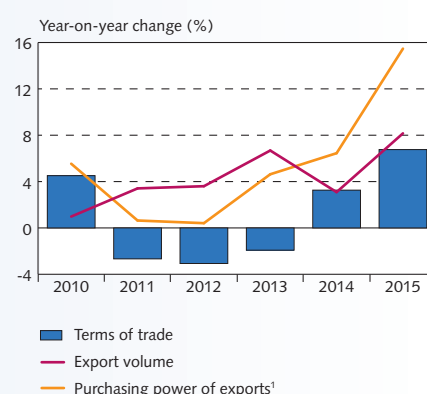
As can be seen in Chart 3, Iceland's terms of trade effect is considerably more positive than that in other OECD countries. The countries coming closest to Iceland are South Korea and Ireland, whereas the terms of trade effect has been strongly negative in other OECD countries that rely heavily on commodity exports, such as Norway. It is noteworthy how different Iceland's experience has been from that of other commodity-exporting countries.

- At the same time, aluminium prices have fallen by a total of nearly 5%. This decline is borne in large part by large international producers. A part of the improvement in terms of trade can also be traced to the recent appreciation of the króna. As is discussed in Box 2 in *Monetary Bulletin* 2015/4, historical experience indicates that a 1% appreciation leads to a roughly 0.2% improvement in terms of trade. In the past two years, the exchange rate has risen by an average of approximately 8%; therefore, nearly a fifth of the 10% improvement in terms of trade is attributable to the appreciation of the króna.
- The terms of trade effect is therefore calculated as $X(\pi_x - \pi_m) / [(1 + \pi_x)(1 + \pi_m)]$, where X is total nominal exports, π_x is the change in export prices, and π_m is the change in import prices. The terms of trade effect is therefore positive if export prices rise more than import prices; i.e., if terms of trade improve.

Box 1

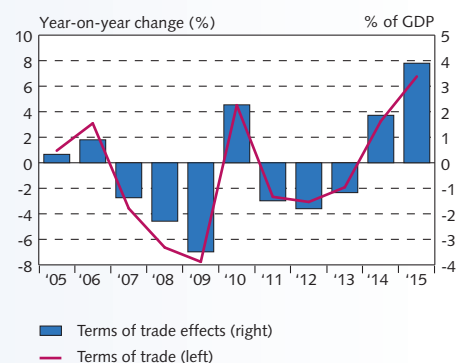
Improved terms of trade and rising economic prosperity

Chart 1
Exports and terms of trade



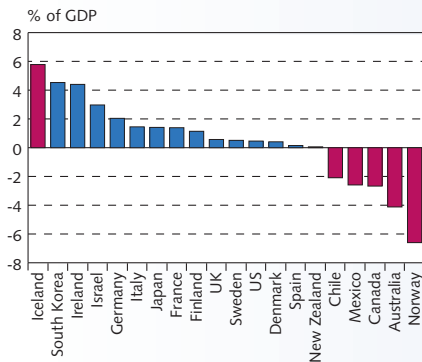
1. Purchasing power of exports measured as the value of goods and services exports deflated with import prices.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart 2
Terms of trade and terms of trade effects¹



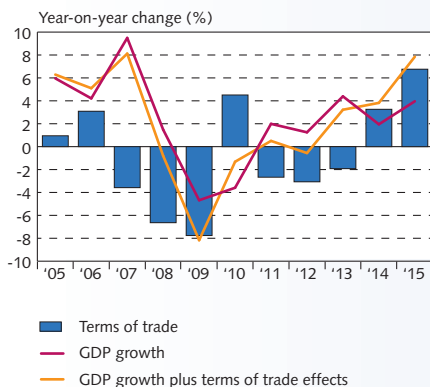
1. Terms of trade for goods and services (relative prices of imports and exports). Terms of trade effects measure the difference between the purchasing power of exports and export volumes relative to the previous year's GDP.
Source: Statistics Iceland.

Chart 3
Terms of trade effects in 20 OECD countries
2014-2015¹



1. The difference between the purchasing power of exports and import volumes relative to the previous year's GDP. Combined effect for 2014-2015. Countries classified as commodity exporters in terms of the weight of commodities in net exports are denoted by red columns.
Sources: OECD, United Nations (UNCTAD), Statistics Iceland.

Chart 4
GDP growth and growth in RGDI¹



1. Real gross domestic income (RGDI) is measured as GDP plus terms of trade effects.
Sources: Statistics Iceland, Central Bank of Iceland.

GDP growth has been strong in the past two years, but when adjusted for the terms of trade effect, the economic recovery is even stronger

The conventional measure of economic activity is gross domestic product (GDP), which reflects the market price of the goods and services produced in a given country. Therefore, by this measure, the volume change in GDP captures the overall growth rate of the economy. In general, developments in GDP should reflect changes in a country's economic well-being with reasonable accuracy, but this need not be the case when terms of trade change substantially. When terms of trade improve, this causes the purchasing power of domestic producers' revenues to rise. The increased revenues then accrue to the owners of the factors of production (i.e., shareholders and employees of the firms) and are therefore channelled into the economy, which then has proportionally more income to purchase domestic and imported goods and services. The purchasing power of GDP therefore increases more than growth in output, which does not fully reflect the increased prosperity in the economy concerned, nor does it reflect the scope that exists to allocate resources domestically; i.e., towards wages and private consumption.

Therefore, to better reflect the state of the economy when terms of trade change as much as they have recently, it would be possible to consider GDP growth as measured by volume changes in GDP adjusted for the effects of changes in terms of trade. This measure of economic activity could be called the purchasing power of GDP and is sometimes called real gross domestic income (RGDI), although this term has not been used in the Icelandic national accounts. As can be seen in Chart 4, RGDI growth has been twice as much as GDP growth in the past two years: in 2014 it was nearly 2 percentage points more, or 3.8% instead of 2%, and in 2015 it was nearly 4 percentage points more, or 7.9% instead of 4%. Conversely, the contraction in RGDI during the preceding years is larger; therefore, average growth during the post-crisis period is the same by both measures, or 0.8%.

National income has also outpaced GDP growth in the past two years ...

Another measure of economic activity – one more commonly used in Iceland – is gross national income (GNI). In addition to the terms of trade effect, GNI takes account of wage and investment income that Icelanders receive from activities abroad, such as that deriving from foreign companies that they own. By the same token, wage and investment income received by foreigners working in Iceland must be deducted. Therefore, the impact of changes in net investment and wage income from abroad – i.e., the balance on primary income – is added to the terms of trade effect.³

In the same way that RGDI growth captures more effectively the direct impact of improved terms of trade on domestic well-being, GNI growth reflects more accurately the effects of changes in net primary income from abroad on the performance of the economy. When the profit of Icelandic firms operating abroad rises, for instance, increased dividends to domestic owners are measured directly through GNI but not through GDP. GNI is therefore a more accurate measure of the resources available to the country for consumption or saving than GDP.

However, the problem with this measure of economic developments lies in how difficult it is to measure this net primary income,

3. GDP plus the balance on primary income is what is termed gross national product (GNP). For further discussion, see Box IV-1 in *Monetary Bulletin* 2013/4.

particularly since the onset of the financial crisis. As is discussed in Box IV-1 in *Monetary Bulletin* 2013/4, the problem lies in the fact that headline net primary income numbers are based on figures that include the calculated accrued interest income and expense deriving from the failed domestic financial institutions' foreign assets and liabilities. Because these institutions' foreign liabilities far exceeded their assets, calculated accrued interest expense came to a substantial amount that reflected neither actual distributions from their estates nor interest expense that would ever be paid, as has now been confirmed with the recently approved settlement of the estates. Therefore, in the aforementioned Box IV, GNI is re-estimated based on the Central Bank's assessment of underlying primary income, which has been used as a basis for the estimate of the underlying current account balance as published regularly by the Bank ever since the financial crisis struck. Chart 5 gives a comparison of these two measures.⁴

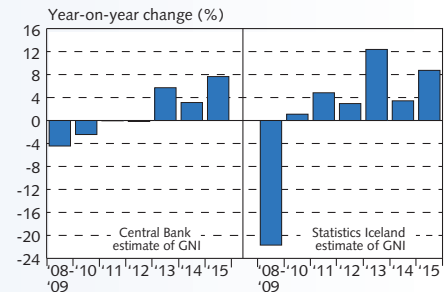
As could be expected, developments diverge greatly just after the crisis, depending on whether they are viewed in terms of headline primary income figures or if the effects of the failed banks' estates on the current account balance are excluded. In terms of the headline figures, the GNI contraction is much greater, but the ensuing recovery is also stronger. The difference has narrowed over time, however, and in 2015, headline figures indicated that growth in GNI measured 8.7%, as opposed to 7.7% when adjusted for the effects of the failed banks' estates on the primary income balance. From 2017 onwards, growth in GNI will be the same by both measures, as underlying primary income will be the same as in the headline figures beginning in 2016.

... and domestic economic prosperity increases somewhat more than is reflected in conventional measures of GDP growth

Chart 6 compares developments in economic prosperity by the three measures described above. As the chart shows, GNI contracted more than GDP immediately after the crisis, irrespective of whether output is adjusted for the terms of trade effect or not, as Icelanders' net income from foreign assets turned much more strongly negative with the collapse of the financial system, even if the effects of the failed banks' estates are excluded. In addition to this, terms of trade deteriorated markedly when the global financial crisis triggered a worldwide economic crisis, which led to a drop in key export prices. As can be seen in Table 1, this double shock caused economic prosperity – in terms of RGDI or GNI – to contract more in the wake of the crisis than GDP itself did. Output began to grow again in 2010, but the two income measures did not begin to rise in earnest until two years later. However, income has risen more rapidly since then, and in 2015, GNI was a full 9% above its pre-crisis peak. GDP has also returned to its previous high and, in 2015, was an average of 5% above the 2008 peak. However, RGDI was slightly less than 4% above the previous peak, as terms of trade were still about 13% below their pre-crisis peak.

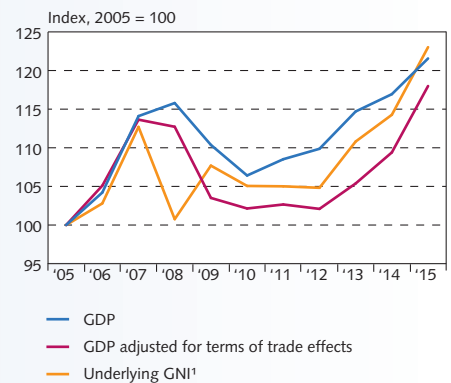
4. Estimating underlying GNI during the year of the onset of the financial crisis is problematical, however, because the failed financial institutions' obligations are included in the assessment of underlying primary income in the first three quarters of 2008 but not in the fourth quarter, when they became insolvent. This causes large fluctuations in underlying GNI in 2008 and 2009, where the deficit on the underlying balance on primary income grows steeply in 2008 and then shrinks again in 2009. Because of this, GNI contracts sharply in 2008 and then grows markedly in 2009. This is why these two years are represented together in Chart 5.

Chart 5
Gross national income – comparison of Central Bank and Statistics Iceland estimates¹



1. The difference between the two measures lies in the treatment of the failed financial undertakings' net interest expense following the financial crisis (see explanation in main text). 2008-2009 are combined, as this interest expense is excluded from the underlying estimate as of Q3/2008, when the failed banks went into winding-up proceedings, creating a large fluctuation in year-on-year growth in GNI between 2008 and 2009. Sources: Statistics Iceland, Central Bank of Iceland.

Chart 6
Different measures of economic activity



1. Underlying GNI is GNI adjusted for the effects of the failed financial institutions on net income on assets from abroad. Sources: Statistics Iceland, Central Bank of Iceland.

Table 1 Post-crisis economic developments (%)

	<i>Terms of trade</i>	<i>GDP</i>	<i>RGDI</i>	<i>GNI</i>
Post-crisis change ¹	-21.0	-8.1	-10.2	-10.6
Change from pre-crisis peak ²	-13.0	5.0	3.8	9.2
Change from post-crisis trough ³	10.2	14.2	15.6	22.1
Growth in 2014-2015	10.2	6.0	12.0	11.0
Growth in 2015	6.8	4.0	7.9	7.7

GDP is gross domestic product, RGDI is GDP adjusted for the terms of trade effect, and GNI is underlying gross national income (see main text). 1. Change in relevant variable from pre-crisis peak (2000-2008) to post-crisis trough (2008-2015). 2. Change between 2015 and pre-crisis peak. 3. Change between 2015 and post-crisis trough.

Sources: Statistics Iceland, Central Bank of Iceland.

Increased economic prosperity and the interaction between wage rises and inflation

The resources available for domestic distribution have grown more rapidly than is reflected in the robust GDP growth of the past two years. To some extent, this can shed light on recent economic developments such as the recent wage settlements and their impact on individuals' consumption and saving decisions, on the one hand, and on inflation, on the other hand.

The wage settlements concluded in 2015 entailed pay rises well in excess of productivity growth, which generally lead to rising inflationary pressures, other things being equal. However, the improvement in terms of trade has given exporters greater scope to absorb such increases. These firms have had less need to pass the additional costs associated with large pay hikes through to prices; furthermore, reduced import prices have lowered the marginal costs faced by firms that use foreign inputs for their production. The direct impact of pay increases on inflation is therefore weaker than it would be otherwise. What remains, however, is the direct impact of pay rises on firms that have not benefited from the improvement in terms of trade, as well as the indirect impact on inflation, through the effect of large wage increases on inflation expectations and demand. These indirect effects can be expected to surface later than the direct effects (the determinants of inflation are discussed in Box 5). Therefore, the improvement in terms of trade in the past two years could shed some light on why the impact of the recent pay increases on inflation has been less pronounced and slower to emerge than originally thought.