Box 1

National accounts – chain-linking and revision for 1990-2003

Statistics Iceland released new data on main national accounts aggregates on September 13. Data for the period 1990-2003 have been revised and annual chain-linking introduced. Year-on-year volume and price changes are now estimated on the basis of relative prices in the former year. These changes are then chain-linked to calculate volume indices and time series that show the development of individual aggregates at constant prices.

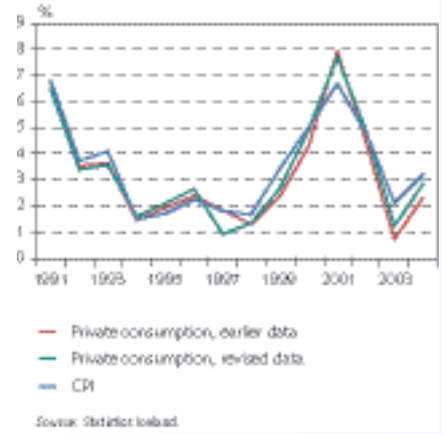
Previously, Statistics Iceland used relative prices for a given year (the base year) over a period of several years. It used 1990 as the base year for volume changes in national accounts for the period 1990-1997, and 1997 as the base year for the period after 1997. Now, in effect, the former of each two contiguous years constitutes the base year.

Distinguishing between price and volume changes is vital to all economic analysis. If a single homogeneous good is sold at a specific price over each period, the distinction between price and volume changes is easy to make. Attempts to distinguish between price and volume changes for a group of goods – for example all the goods consumed by households (private consumption) or all capital goods used in investment – complicate the picture enormously because both relative price and the volume of different goods change continuously. Ten years ago the price of mobile phones and mobile phone calls made little difference to estimates of private consumption price changes, but now it is quite significant. Thus a sizeable error may be introduced by using a distant base year. The main advantage of chain-linking, as now used by Statistics Iceland in its estimates of volume changes in the national accounts aggregates from 1990 inclusive, is that the base year is always very recent.

Changes in the volume and price of goods between periods

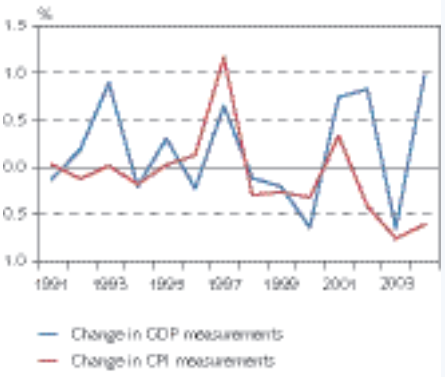
Period:	*1*	*2*	*3*
Price			
Price of good 1	150	160	170
Price of good 2	100	90	105
Relative price	1.50	1.78	1.62
Volume			
Volume of good 1	10	12	14
Volume of good 2	30	31	32
Total value	4,500	4,710	5,740
At period 1 prices			
Good 1	1,500	1,800	2,100
Good 2	3,000	3,100	3,200
All goods	4,500	4,900	5,300
Total value	4,500	4,900	5,300
Change		8.89%	8.16%
At period 2 prices			
Good 1	1,600	1,920	2,240
Good 2	2,700	2,790	2,880
All goods	4,300	4,710	5,120
Total value	4,300	4,710	5,120
Change		9.53%	8.70%
Chain-linking (period 1 prices)			
Good 1	1,500	1,800	2,100
Good 2	3,000	3,100	3,200
All goods	4,500	4,900	5,327
Change		8.89%	8.70%
Total value	4,500	4,900	5,300
Change		8.89%	8.16%

Chart 1
Private consumption prices and the CPI 1991-2004



Source: Statistics Iceland

Chart 2
Discrepancy between revised and earlier measurements of GDP volume and the CPI 1991-2004



Source: Statistics Iceland

In order to produce time series over a longer period, volume and price changes which are calculated using different base years need to be linked. The usual method is to produce a series where relative changes are the same as in the series from which the linked series is produced. When this is done it should be remembered that the total of linked items almost never equals the linked totals. An example is given below, using the price and volume of two goods over three periods given in the table.

The table shows that if the volume changes are estimated using the prices in period 1, the volume changes in the aggregate are 8.89 and 8.16% while if the prices in period 2 are used the changes are 9.53% and 8.70%. In both cases, the estimated volume of the two goods equals the total of the items at constant prices. This alters when different base years are used and the changes are chain-linked. The lower section of the table shows that in this case there is a 0.5% difference between the estimated changes in the volume of the aggregate good between period 2 and period 3 and the change in the sum of the value of each good at constant prices.

These new methodologies produce new measurements for price and volume changes in Iceland's national accounts. Thus year-on-year GDP growth measures 0.8 percentage points more in 2002, but 0.7 percentage points less in 2003 using the new methodology. The year-on-year change in GDP prices is the same in 2002, but in 2003 it measures 0.3 percentage points more.

Private consumption is by far the largest component of GDP. The revision of aggregates narrows the discrepancy that has existed between changes in private consumption prices and changes in the consumer price index (CPI). As a result of Statistics Iceland's new methodology, the year-on-year change in private consumption measures 0.4 percentage points less than previously estimated in 2002 and 0.8 percentage points less in 2003. However, the year-on-year price change is 0.5 percentage points higher for both years. Although the discrepancy has been reduced, Statistics Iceland's new data still show less change in private consumption prices than in the CPI in recent years (see Chart 2).