



Description of the base year revision (2000=100) of the producer price index for manufacturing

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Introduction

The aim of the Producer Prices (PPI) is to provide timely and detailed information about the price developments of Dutch manufactured and imported industrial products. Each month Statistics Netherlands surveys price information and calculates a price index.

The PPI uses price information about Dutch manufactured and imported industrial products. It follows price developments for a 'basket of products' that is representative for a given base year. The price index numbers of commodity groups are weighted with values referring to this base year. Once every five years, Statistics Netherlands selects a new base. This is because production, and with that the weights, shift over time. The price index series published until December 2003 had 1995 as its base year. The base shift creates a new PPI series with 2000 as its base year.

A base shift is usually also a good time to introduce other changes. These may be based on new user demands, new insights, or improvements in statistical co-ordination. The current base shift includes such changes, as will be described below.

Changes in PPI

Four changes implemented with the rebasing to 2000=100 are usually part of any base year revision. These are:

1. *New weights*

The aim of a base shift is to adjust the weighting scheme of the statistic to shifts in production. In the current base shift Statistics Netherlands adjusted both the weights of the commodity groups and the weighting of enterprises within commodity groups in such a way that they are representative for the situation of base year 2000.

2. *Improved price information*

In recent years enterprises sometimes provided better price information after the index series had already been published. This improved price information was stored and used in the current rebasing. In a few cases, entirely new price series

were introduced, which better reflected the price developments in the commodity group involved.

3. *Changes in classifications*

The PPI classifies the commodities for which Statistics Netherlands monitors price developments according to the Prodcom list, a European classification of commodities. Aggregates are published according to the Prodcom list. Furthermore series are published according to the Standard Industrial Classification (SIC). Between 1995 and 2000 Prodcom was adjusted Europe-wide. The level of detail available in 1995 was limited in the 2000 edition. European legislation on short-term statistics furthermore means that certain commodity groups are no longer within the scope of the PPI.

Finally both classifications are adjusted (updated commodity and enterprise groups).

4. *Adjusted publication scheme*

The changes in the classifications and the availability of basic material for weighting have their consequences for publication. In practice the publication scheme for commodity groups has been adjusted slightly. The publication scheme for SIC became less detailed because there was insufficient basic material available for the reporting year 2000.

Two other major changes were implemented alongside the rebasing.

5. *Improved price index formulas*

The selection of index formulas dated back to the late eighties. The Dutch economy has since had to deal with globalisation, privatisation, and increased free market dynamics due to the liberalisation of certain markets. Due to market dynamics, some prices fluctuated dramatically. Price fluctuations occurred for instance during the epidemics of mad cow disease and hog fever a few years ago. In 2003 there were extreme price changes on the electricity market. The price index formulas were insufficiently capable of dealing with such increased dynamics. Therefore the old formulas were replaced during this rebasing by

robust, new formulas that can handle sharp price fluctuations. The interested reader may consult the article PPI Methodology for the new index formulas.

6. *Publishing an index based on prices including duties*

Since January 2000 the European Union requires additional index series in the publication scheme, based on prices including duties. The series, based on prices excluding duties will still be available.

Effects of the changes on the outcome

Four of the six changes mentioned above lead to differences between the old and the new index series. The adjusted publication scheme (cause 4) has no effect on the outcomes, because the series involved are only added or deleted from the publication. Price observations of the commodity groups involved continue and the index series weigh normally in the calculation of the higher aggregation levels. The last change (6) leads to an entirely new series without influencing the series without duties.

The other causes of change involve

- Data (cause 2);
- Method (cause 5);
- Weighting (cause 1, 3).

The effects of changes in the classifications are categorised under weighting, because that is where they manifest in the analysis. The effects are discussed below.

Data

In recent years data was corrected after price indices were published, usually because the respondents submitted better data. Two new index series were added during the rebasing; for electricity and for gas. Both industries saw major upheavals since 1995 in how the branch was structured: there were shifts in the market shares of enterprises, and some phenomena, such as the export of electricity, did not yet exist in the Netherlands.

Both adjustments were not included in the series 1995=100 because the figures were not yet available when the months involved were finalised or when the rebasing was implemented. However, they provide a better understanding of reality than Statistics Netherlands was able to provide before.

The effect of these adjustments on the series 2000=100 is not systematic; there are upward and downward adjustments.

Method

The method for the series 2000=100 differs considerably from the old 1995=100 method¹⁾. The calculation of the PPI index involves three steps.

1. Goods

Step one is to average the price developments of goods within a given commodity group within the enterprise. In this weighting step, each of the goods has the same weight.

The old method used an arithmetic mean for averaging the price developments of goods within the enterprise x commodity group combination. The new method uses a geometric mean. In comparable price developments of goods within an enterprise x commodities group combination the geometric and arithmetic mean are virtually the same. They are only different when there are substantial differences in the price developments of goods within an enterprise x commodities group combination, hitting extremes in a combination of rising and falling prices.

The new method (geometric mean) is far less sensitive to outliers. When price developments of goods within an enterprise varied substantially, it would lead to upward pressure on the price index in the old method. This was far less current in the late eighties when the formulas for the old method were selected.

2. Enterprises

Step two is to transform the price developments for a commodity group calculated in this way across the enterprises, into index figures for the commodity groups at the lowest aggregation level. This is done with a weighted mean.

In the old method, the price developments of the various enterprises were recalculated into index figures for the various detailed commodity groups by means of a chain index with fixed weights. It turns out that this method leads to upward drift, especially in dynamic markets. In the new index formula, we use an index with a fixed reference period allowing us to adjust the weights of the enterprises once a year to the changing conditions in the market.

The new method only yields very different results when prices develop very differently within a commodity group at the lowest aggregation level. When the old method was selected (pre-1990) the expectation was that the phenomena would rarely occur. There are also theoretical arguments to fix the turnover shares of the various enterprises (weights), even in a situation of a chain index (Young index).

¹⁾ For a detailed description see: [New index formulas for the statistic producer prices manufacturing](#).

3. Commodity groups

Step three is to calculate the index figures for a higher aggregation level by using weighted means of the index number at the lowest aggregation level. Nothing in this method has changed.

Weighting

The main reason, traditionally, to have a base shift is to update the weighting schemes, so that they represent the new production situation between enterprises and market shares. Each base shift has a change in weighting. The producer price index has weighting at three levels:

1. Weighting of goods within an enterprise x commodity group combination. At this level there is no differentiated weighting: each product gets the same weight.
2. Weighting price developments of enterprises into index figures for commodity groups at the lowest aggregation level. This internal weighting represents the share of individual enterprises in the sales of the commodity group. No change of method was applied in determining the weights. Most weights for sales come from the Prodcom statistic 2000, which yielded amounts of turnover per enterprise per commodity group. If necessary these data are enriched by different information available at Statistics Netherlands or obtained from the enterprises themselves. In a number of commodity groups (including gas and electricity) we used physical quantities. We applied no differentiated weighting for imports, just as in the old base, because it is not possible to use data from the International trade statistics due to technical reasons.
3. Weighting the price index figures for commodity groups at the lowest aggregation level for higher aggregation levels or outcomes for groups of enterprises according to SIC. This external weighting represents the sales ratio between the various commodity groups. This method has not changed. The basic material comes from the supply and use tables of the National Accounts 2000, enriched with information from the PPI and Prodcom statistic 2000.

The differences between the 1995=100 and 2000=100 series

In this section we will explain the differences between the series 1995=100 (old) and the series 2000=100 (new). First we will discuss the outcomes for the main aggregates at the commodity group level (total industrial product) for domestic sales, exports and imports. Next we will illustrate a number of individual effects of the changes. In each case we will show the index series for the period 2001–2003. The series 1995=100 are rescaled in such a way that 2000=100 applies. We will explain the method of comparison on the basis of domestic sales; the

treatment of the other two series will be limited to a discussion of the differences.

Overall picture

Domestic sales

Graph 1 shows the 'old index series' and the 'new index series'. Two things should be noted: the new series is lower than the old series throughout the period, and the difference between the two tends to increase. Only at the start of 2003 did the difference become smaller for a while, only to increase again after. The other two lines in the Graph help illustrate the effects of the causes for the differences.

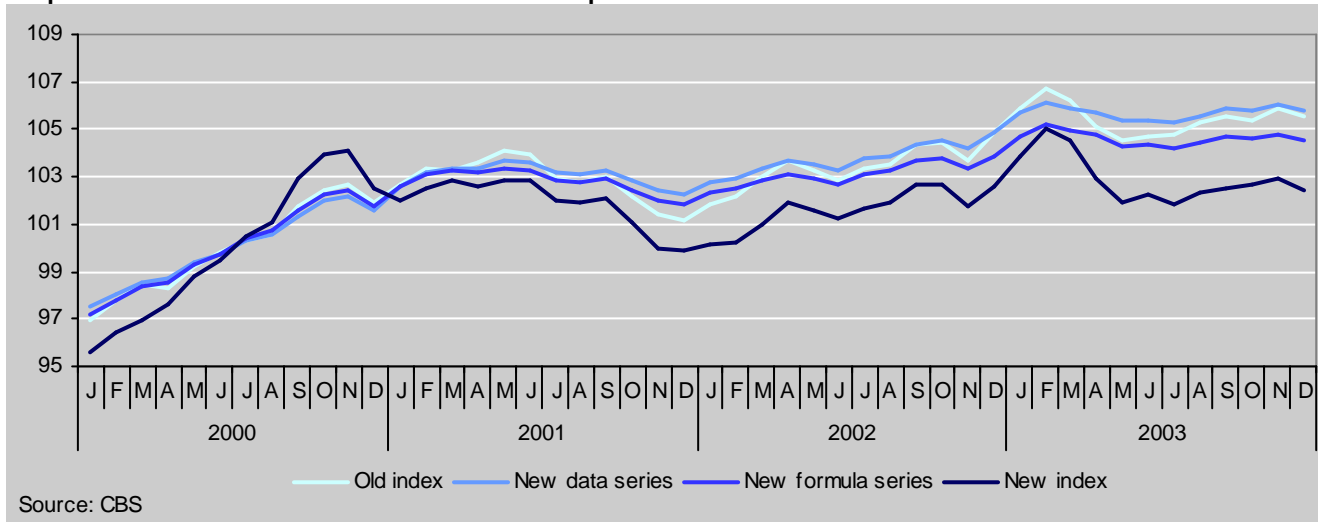
The line 'new data series' shows the effect of the improvements in the base material. This index is calculated with the old formulas and the weighting and classifications of base 1995=100. So the first line should be compared to the 'old index series'. The differences between the two lines are maximally 1 percentage point and the average over the entire period is 0.2 percentage points. The 'new data series' is generally higher than the published series, but the data improvements do not have an a priori upward effect.

The line 'new formula series' is the result of the application of the new index formulas to the classifications and weighting of base 1995=100. A comparison of this line with the 'new data series' quantifies the effect of the new index formulas on the outcome. The effect on domestic sales turns out to be modest: the difference between the two series increases over a four year period, by late 2003 it is over one percentage point. The outcome is consistent with the expected effects of the new formulas: three adjustments were made compared to the old formulas to prevent 'upward drift'.

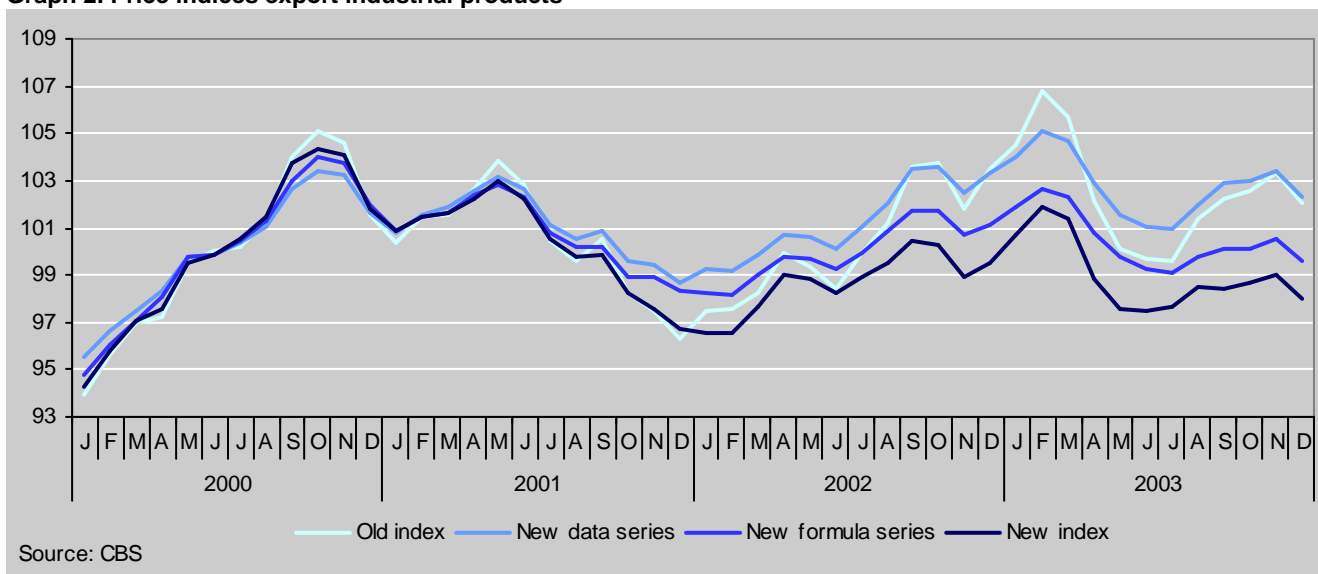
The difference between the line 'new formula series' and 'new index series' shows the combined effect of the new weighting and the adjustments in the Prodcom classification. This gives some remarkable results. In the first place the new weighting pushes the series down further. In the second place the 'new index series' is more volatile than the 'new formula series'.

The 'new data series', 'new formula series' and 'new series' are beneath one another in this order. Apart from the data effects, the difference between the first and last shows the difference between the old and the new series. The steps via the series in between quantify the effect of the new index formulas and the new weighting respectively. Over the period January 2001–December 2003 the formula effect is good for over 30 percent of the difference between the old and the new series, and the weighting effect almost 70 percent.

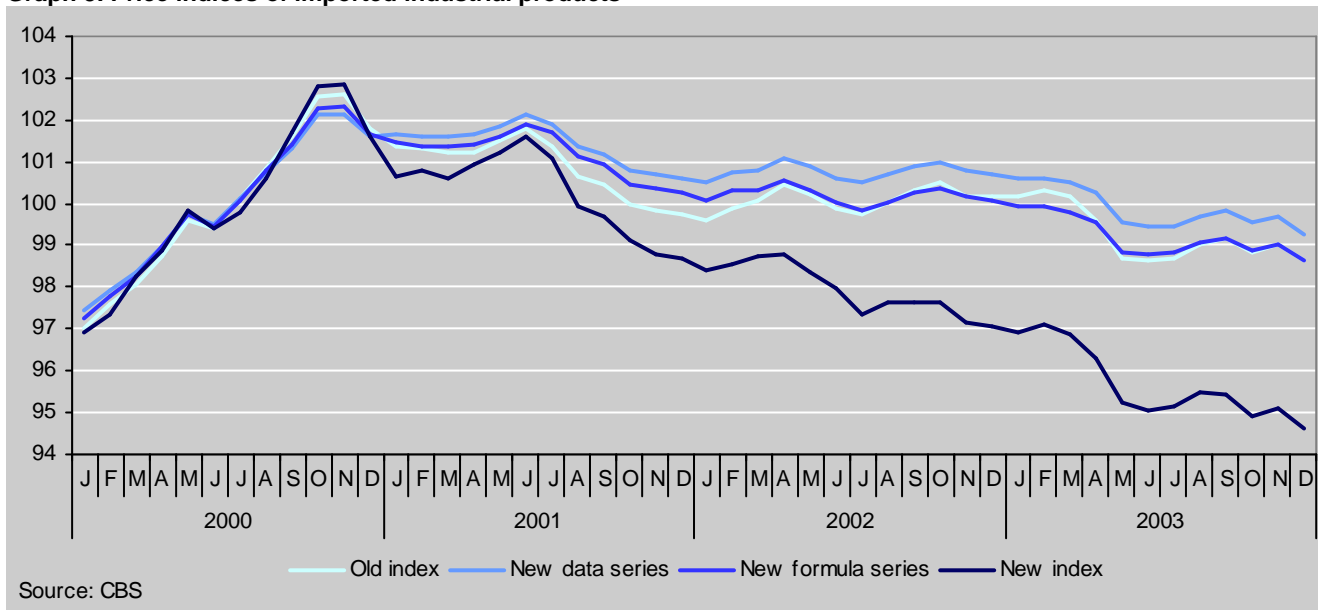
Graph 1. Price indices domestic sales of industrial products



Graph 2. Price indices export industrial products



Graph 3. Price indices of imported industrial products



Exports

Graph 2 shows that the effect of the new data in this series is larger than in domestic sales: the maximum difference with the published series is almost 2.5 percentage points and there are more areas in the series with relatively major differences. The mean difference is 0.5 percentage point.

The new index formulas also exert a downward pressure on the index series in this sales category. On average the formula effect in the period January 2001–December 2003 caused over 60 percent of the difference between the old and the new series, and weighting the rest.

When comparing the international and domestic sales series one has to take into account that the 'product mix' of the two differs considerably; therefore the new weighting in sales abroad did not change more than in domestic sales.

Imports

The effect of the new data in this series (graph 3) was positive for nearly every month. The maximum is less than one percentage point. The mean difference is 0.5 percentage point.

The new index formulas have a downward effect on the index series in this sales category as well. In this case the effect is limited. On average for the period January 2001–December 2003 the formula effect caused over 20 percent of the difference between the old and the new series, and weighting the rest, almost 80 percent. The difference between the old and the new series increases over the years.

In comparing the import series with the two sales categories one has to take into account once again that the 'product mix' of the imports and the two sales categories differs considerably. Crude oil, ore and computers only play a role in imports.

Conclusions

1. The effect of better data is generally limited, but leads on average to higher indices.
2. The other adjustments together lead to index series well below the old series. Working with new weights often has this kind of effect, and the new index formulas are less susceptible to upward drift. The cumulative difference varies considerably between the three categories discussed.
3. Dividing the difference between the old and the new series into a formula and a weighting effect also provides a mixed view: in imports the new weighting causes 20 percent, and in domestic sales 70 percent of the difference. International sales, with 40 percent is somewhere in the middle.

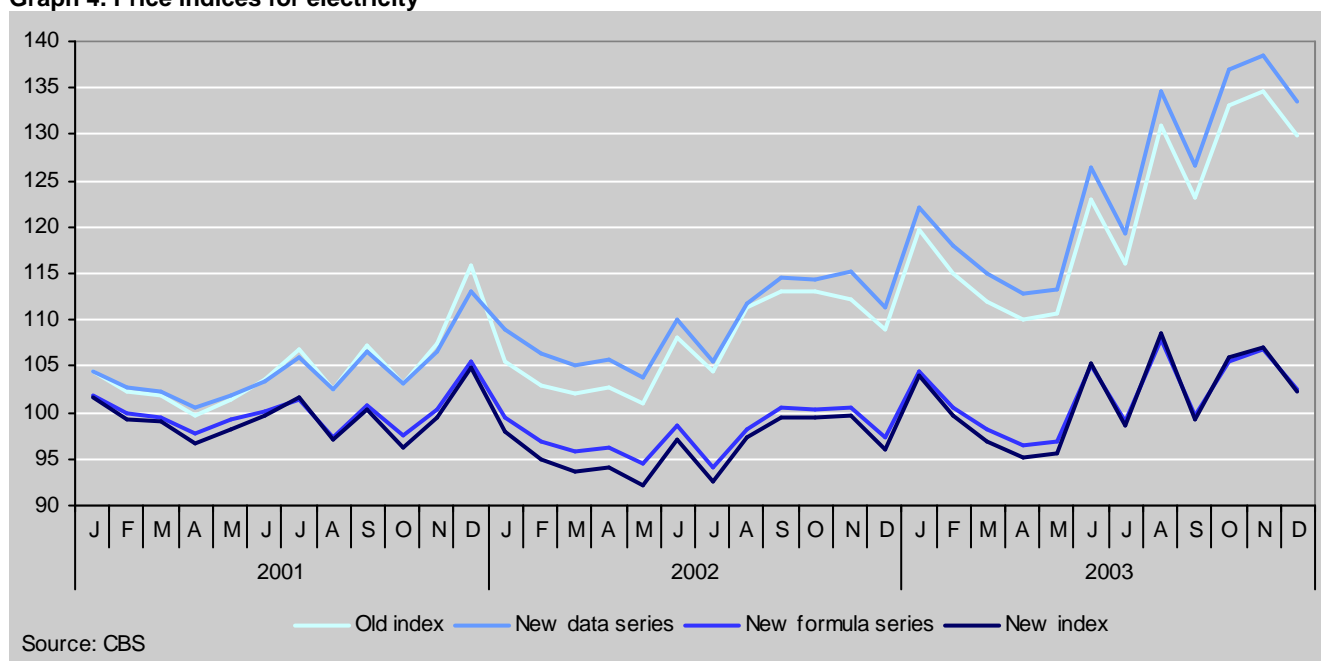
Other issues

The analysis above shows that while all causes of differences play a role at a high aggregation level in some way, it is true for individual index series that individual causes may play a key role. In this section we will illustrate this with some examples.

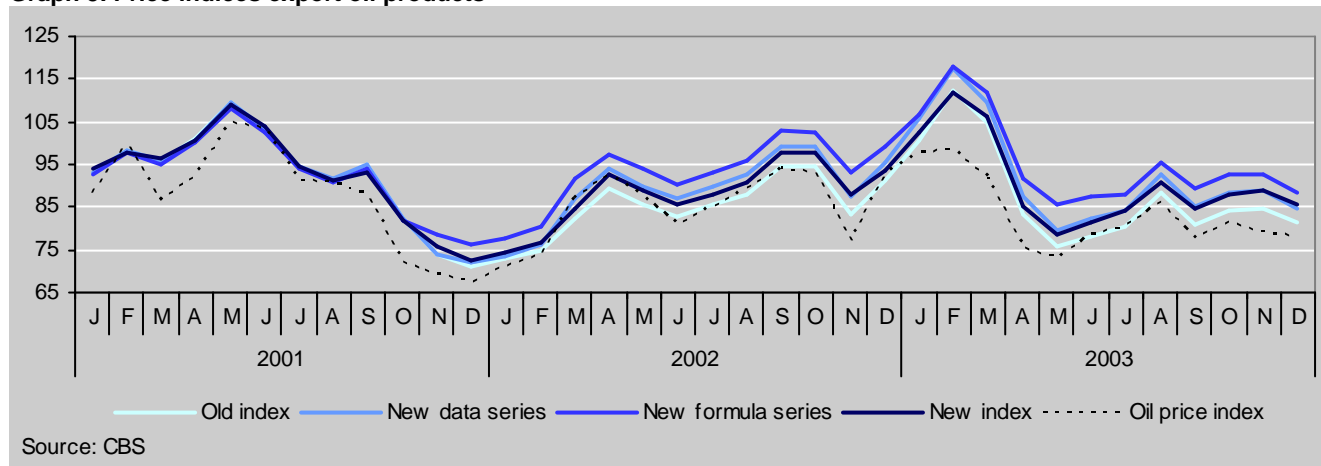
Electricity

For electricity the difference between the old and the new series is almost exclusively due to the new index formulas; both new data and new weights hardly have any effect on the outcome (see graph 4).

Graph 4. Price indices for electricity



Graph 5. Price indices export oil products



Until June 2003 the difference between the old and new series gradually increases to 15 percentage points. After this the index increases rapidly to about 30 percentage points. The effect of price jumps on the old index formulas in this series is illustrated clearly. After the price jump in the summer of 2003 the new index formula was up by almost 1 percentage point, while the old formula was up by over 6 percentage points. In the summer of 2003 there was a brief but enormous rise in electricity prices for short-term contracts (APX). The old index formula clearly resulted in upward drift.

Oil products

Price bouncing in itself need not be a problem, as is illustrated in graph 5. Oil products undergo major price fluctuations. The new weights and formulas hardly have any effect on the level or the developments of the series. The improved price information has an average effect of about 5 percentage points (see the difference between the 'old index series' and the 'new data series'). The other three series virtually cover each other. This phenomenon is due to the fact that the price formation of oil products is heavily dependent on developments in crude oil prices. All producers and products follow crude oil prices, and in such cases the upward drift effects of the old formulas play no role at all.

Sequence of the analysis

In an analysis of the differences such as given above, the sequence in which the elements are introduced may influence the conclusions. The sequence used is: new data – new formula – new weights. The first step cannot be changed for technical reasons. The only alternative is new data – new weights – new formula. Statistics Netherlands also calculated this alternative. The conclusions of the alternative analysis are identical to the ones presented above.

Conclusions

1. For individual index series the difference between the old and the new series may be due to a single cause or to a combination of causes.
2. The other adaptations put together lead to an index series below the old series. This was to be expected because working with new weights will often lead to a downward adjustment, and the new index formulas are less susceptible to upward drift. The cumulative difference, however, varies substantially between the three categories we discussed.