Rebasing the price index number
of the building costs of new dwellings

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Explanation of symbols

.	= data not available
*	= provisional figure
x	= publication prohibited (confidential figure)
–	= nil or less than half of unit concerned
–	= (between two figures) inclusive
0 (0,0)	= less than half of unit concerned
niets (blank)	= not applicable
2003–2004	= 2003 to 2004 inclusive
2003/2004	= average of 2003 up to and including 2004
2003/'04	= crop year, financial year, school year etc. beginning in 2003 and ending in 2004
2001/'02–2003/'04	= crop year, financial year, etc. 1993/'94 to 2002/'03 inclusive

Due to rounding, some totals may not correspond with the sum of the separate figures.

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Statistics Netherlands calculates the price index number of the building costs of new dwellings (PINW) to monitor developments in the prices of newly-built houses in the Netherlands. Starting from the figures for the first quarter of 2005, the PINW is published with 2000 as the new base year. The new series will be calculated ex post for the first quarter of 2000 onward. A base year revision in this case means that the show house, which is used as a basis for monitoring the price developments of new dwellings, is related to a new base year. The consequence of the rebasing is that the PINW for the first quarter of 2000 to the fourth quarter of 2004 differs from the index for the same period based on 1995=100. Besides the influence of a regular base year revision on the course of a price index, the course of the PINW is also influenced by methodological changes which become valid for all years since 2000 because of the base year revision.

This paper examines the changes involved in the rebasing, and the differences between the index series based on 1995=100 and 2000=100. The first section contains a short description of how the PINW was calculated on base 1995=100. Next, the base year revision and attendant changes in the price indices are discussed. The third section deals with the treatment of methodological changes. Lastly we give some advice on how to link the old and the new series.

1. Calculating the PINW

The PINW is based on information from the municipal administrations (the number of building licences granted). A building license concerns one building project, which may consist of one or more dwellings. The building costs per dwelling are calculated on the basis of the number of dwellings in a project. The building costs are the costs paid to the building contractor. This makes the PINW an output price index.

Monitoring the price development of the building costs of dwellings is a difficult task, because there are no identical buildings built in consecutive periods of which we can monitor the price developments. In order to overcome this problem we use a hedonic method. This method provides the possibility to accommodate quality and measure the prices without the need of identical dwellings that can be observed in consecutive periods.
The hedonic method means that the average building costs are estimated in a regression model on the basis of some price-defining variables. These variables are [1] content of the dwelling (in cubic metres), [2] the number of dwellings in the project, [3] type of client, [4] type of soil, and [5] type of dwelling (rental or owner-occupied). Based on information from the base year (1995) a show house is determined, expressed as means of the five variables. This show house is no real new dwelling, but an "average" house used for monitoring price changes through times. Subsequently the building costs of the show house are estimated each quarter by means of the coefficients of the variables. In order to get a price index number, the estimated building costs are compared with the estimated mean building costs in the base year.

Not all dwellings are included in the regression analysis. We determine outliers in order to prevent that peaks in building costs or the content of the dwelling have too much influence on the price index. The current outlier detection method indicates for each dwelling to what extent the building costs could be accounted for by the variables in the regression model. The dwellings with the smallest accounted factor are not included in the calculation.

2. Alterations as a result of the rebasing

A base year revision of a hedonic model implies a redefinition of the show house for the new base year, in this case 2000. This means that new averages of the variables are calculated for the year 2000. Also the base price, the estimated mean building costs of the show house, are recalculated. The new show house expressed as the averages of the variables and the base price, leads to differences in the development of the new price indices as compared to the series 1995=100. These differences are shown in the graph below. The series 1995=100 is the PINW as it has been published on the basis 1995=100, and is rescaled in such a way that 2000=100 in order to make it easier to compare the series with the new series. The second series is the PINW with base year 2000 when the way of calculation would have followed the exact same course as with base year 1995.

1. **Price index PINW series 1995=100 rescaled and series 2000=100 calculated according to the old method**
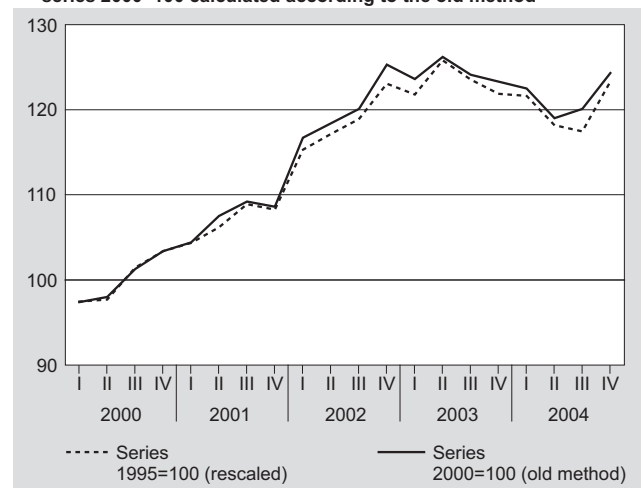
Both series show largely the same developments. The curve of the new series 2000=100 runs a little above the old series, yet both series show peaks and lows at practically the same moments. The sole cause of the difference between the two series is the new show house. The show house of 2000 shows some interesting changes from 1995. The newly build dwellings in the year 2000 have on average a slightly larger content in cubic meters. Furthermore more bigger projects, i.e. projects containing more dwellings, were built, and the share of owner-occupied houses is larger for the year 2000 than for 1995. These averages together with the averages of the other variables are shown in appendix 1.

What is most noticeable in the graph is the difference in course between the second and third quarter of 2004. The series with base year 1995 is still declining, while the new series already rises. This difference is caused by the change in the base year average of the client "Government and housing corporations". The share of this client is lower in base year 2000 than in 1995 and the client shows a strongly declining coefficient in the period concerned. Multiplied with the new base year average this decline weighs much heavier for the old series than for the basis 2000=100. As a consequence the average estimated building costs in the third quarter of 2004 rises in the series 2000=100 but not for 1995=100.

3. The new PINW

Apart from the above-mentioned standard change for a base year revision of a hedonic model, some changes have come into force in the calculation during the past years that influence the course of the PINW. This section examines these changes and their effects on the PINW.

3.1 Changes in the calculation method

The most important change concerns the new method for outlier detection. The old method was used until the third quarter of 2002, but it was not ideal for a hedonic model. For this reason we introduced a new, improved method for outlier detection. As of the rebasing all quarters until the third quarter of 2002 are also calculated with this new method.

Another change concerns the show house. In the series 1995=100 the show house was determined on the basis of a weighted data file since the first quarter of 2001. Previously the show house was calculated unweighted. The data file consists of permits which refer to projects, so in fact the averages of projects were determined and not the averages of dwellings. The result of the rebasing is that now also the price indices of the year 2000 are calculated on the basis of a show house from a weighted data file.

Not only the above-mentioned methodological changes but also the use of later source information makes it hard to compare the new PINW with the old series 1995=100. For example, all permits reported until the fourth month of 2005 have been included in the calculation, including some permits that were reported after the closing date for the quarter. These permits are now part of the calculation.

3.2 The new series 2000=100

Graph 2 shows three series. The graph is equal to graph 1, with one addition: the PINW as it will be published with 2000=100. This series includes are all above-mentioned changes in the calculation.

No methodological changes have been made in the calculation of the PINW as of the first quarter of 2003. This means that the only cause of differences between both series since this period is the inclusion of subsequent building permits. Graph 2 shows that the subsequent permits have no noticeable influence on the course of the PINW. Furthermore, the graph shows that the published series PINW has a smoother course than the series conform the old calculation method. This change in the course is mostly caused by the introduction of the new outlier detection method.

The name PINW was changed to show the difference with the input price index number of new dwellings more clearly. The new name is "output price index number of new dwellings". For this reason you can find the PINW in StatLine under the new name "new dwellings, output index 2000=100".

4. The transition from reference year 1995=100 to 2000=100

At the same time as the publication of the new figure for the first quarter of 2005, the figures for the series 1995=100 were revised for the last time based on the most recent building permits. After this, the old series is declared definite and more recent figures are only available in the series 2000=100.

2. Price index PINW series 2000=100 calculated according to the old method and the publication series, and the series 1995=100 (rescaled)
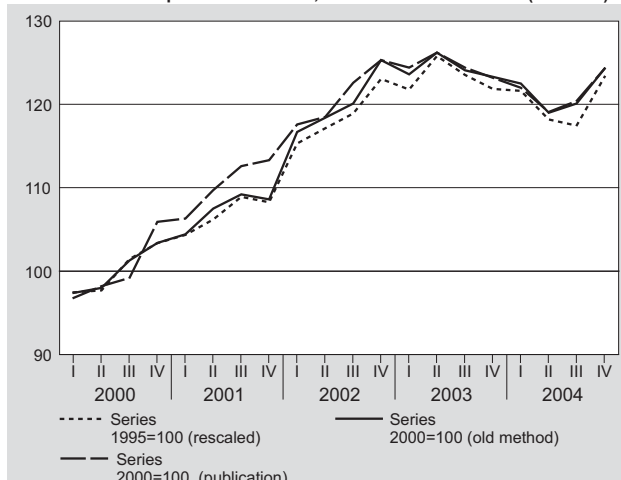
For administrative use (for example in contracts) of the PINW, Statistics Netherlands advises to employ the following basic assumptions:
– The price lopments will be calculated as much as possible within one published series.
– Adjustments and corrections ex post will be avoided as much as possible.

On the basis of these assumptions Statistics Netherlands gives the following advice:
– The calculation of a price change over a period starting in or after the first quarter of 1995 and ending no later than the fourth quarter of 2004 is based on the series 1995=100.
– The calculation of a price change over a period starting in or after the first quarter of 2000 and ending after first quarter of 2005 is based on the series 2000=100.
– The calculation of a price change over a period starting between the first quarter of 1995 and the fourth quarter of 1999, and ending after the first quarter of 2005 is based on the linked series 1995=100. From the first quarter of 2005 the percentage change with the last quarter of 2004 must be calculated, as the price index for the last quarter of 2004 is the last figure published on base 1995=100; this change must then be adjusted to the results for the last quarter of 2004 of the series 1995=100 (see example).

Quarter	Price index 1995=100	Price index 2000=100	Linked series
4th quarter 2004	154	124	154
1st quarter 2005		121	150

The index of the first quarter of 2005 of the linked series is calculated by calculating the difference between the fourth quarter of 2004 and the first quarter of 2005 according to the series on 2000=100 and multiplying this by the index for the fourth quarter of 2004 according to the series 1995=100. In the example: (121/124) * 154=150 (rounded). For the second quarter of 2005 the index is calculated analogously, where the figures of the last quarter of 2004 must be used for the link because of rounding problems.

Statistics Netherlands itself does not compile long-term series with linked price indices the building costs of new dwellings.
If you have any questions please contact the infoservice of Statistics Netherlands.

Appendix 1

The show house is a virtual dwelling, expressed in the averages of the variables of the new base year. The figures mentioned below are the averages of the variables in the years 1995 and 2000. The variables with * are included in the calculation as means of their logarithm. In this table they are expressed as means of their values in order to give a clearer image of the changes of the show house. The remaining variables are dummy variables, which means that they take the value 0 or 1. The averages in this table show the share within the variable per subcategory.

Table 1
The show house in base years 1995 and 2000

	1995	2000
Content of the dwelling in cubic metres*	422	494
Number of dwellings per project*	37	61
Soil		
Sand, flats, hilly, and dunes	0.51	0.45
Fenland	0.1	0.1
River region	0.08	0.12
Sea clay	0.3	0.31
Tidal area Zeeland and closed inlets	0.01	0.02
Client		
Government and housing corporations	0.3	0.14
Builders for the market and institutional investors	0.5	0.67
Private individuals and other	0.2	0.19
Type of dwelling		
Rental	0.3	0.14
Owner-occupied	0.7	0.86