

Rebasing the Output Price Index  
of newly built dwellings,  
2005=100

09

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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
blank	= not applicable
2007–2008	= 2007 to 2008 inclusive
2007/2008	= average of 2007 up to and including 2008
2007/'08	= crop year, financial year, school year etc. beginning in 2007 and ending in 2008
2005/'06–2007/'08	= crop year, financial year, etc. 2005/'06 to 2007/'08 inclusive

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

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## 1. Foreword

Statistics Netherlands calculates a quarterly output price index of newly built dwellings (OutputPrijnsIndex van NieuwbouwWoningen, O-PINW) to monitor developments in the prices of newly built dwellings in the Netherlands. Starting from the figures for the first quarter of 2009, the O-PINW is published with 2005 as the new reference year (2005=100). The basic dwelling, which is used as a basis for monitoring the price development of new dwellings, is based on the most recent regulations, in this case 2007. As a consequence of the base shift, the O-PINW for the first quarter of 2005 to the last quarter of 2008 differ from the index for the same period based on 2000=100.

This paper examines the changes involved in the base shift, and the differences between the index series based on 2000=100 and 2005=100. The next section contains a short description of how O-PINW was calculated on base 2000=100. The third section discusses the base year revision and subsequent changes. The fourth section deals with quality corrections and the course of the indices. Lastly, we give some advice on how to link the old and new series.

## 2. Calculating the O-PINW

The O-PINW is based on information from the municipal administrations (the number of building licences issued). Municipalities provide these data to Statistics Netherlands every month. Building licences are issued on a project basis, i.e. more than one dwelling may be constructed with one licence. The observed prices refer to complete projects. Prices per dwelling are calculated by dividing the project price by the number of dwellings in the project. The building costs are the costs paid to the building contractor, and thus include general costs, profits and risk. This makes the O-PINW an output price index.

Monitoring the development of building costs of dwellings is difficult because no identical dwellings are built in consecutive periods for which we can monitor 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 being 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] volume of the dwelling (in cubic metres), [2] the number of dwellings in the project, [3] category of commissioning party, [4] type of soil, and [5] market sector of dwelling (owner-occupied or rental). Based on information from the base year (2007) a basic dwelling is determined, expressed as means of the five variables. This basic dwelling is not a real new dwelling, but an “average” house used to monitor price changes through time. Subsequently each quarter the building costs of the basic dwelling are estimated by means of the coefficients of the variables under the assumption that the dwelling was built in the quarter concerned. In order to calculate a price index, the estimated building costs are compared with the estimated mean building costs in the reference year.

Not all dwellings are included in the regression analysis. We determine outliers in order to prevent peaks in building costs or the volume of the dwelling affecting the price index too much. 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. Because all dwellings under one building licence receive the same accounted factor, they will all be removed from the dataset in this case.

## 3. Alterations as a result of the base shift

For the first time in this series, the base year (2007) and the reference year (2005) are not the same. Moreover a new basic dwelling is calculated from the data of 2007, the new base year.

### 3.1 Reference period

The reference period is the period for which the average index numbers are rescaled to 100. In this case it is 2005 (=100). Because the index is the quotient of the building costs of the period under review and the reference period, the reference price – the estimated mean building costs of the basic dwelling in the reference period – is recalculated.

### 3.2 Base period

The base period is the period for which the basic dwelling is defined; the most recently available complete year is chosen for this. The advantage of this choice is that the price development of the most recent dwellings is measured. Because 2007 is the most complete and most recent dataset, the new basic dwelling is redefined for 2007. The year 2008 is not an option as not all building permits granted in 2008 have been reported to Statistics Netherlands yet.

### 3.3 New basic dwelling

The new basic dwelling is based on the average values of the variables used in the regression. Table 1 shows the means of the old base year 2000 and the new base year 2007. The comparison shows that the volume of newly built dwellings was 7 percent larger in 2007 than in 2000. The main reason for this is a regulation introduced in 2003 which prescribes higher ceilings. The average number of dwellings per project fell from 62 in 2000 to 51 in 2007, and compared with 2000 the percentage of houses built for the rental sector was higher. This is confirmed by the increase of newly built dwellings commissioned by the government and housing corporations.

The new basic dwelling, expressed as the averages of the variables and the base price, leads to differences in the development of the new price indices compared with the series 2000=100. These differences are shown in graph 1. In the new series with base year 2007 and reference year 2005, the O-PINW is based on all available data. The other series shown – with base and reference year 2000 – is recalculated for the same dataset. This dataset differs from the one used for the published index series 2000=100, as a result of the addition of building permits reported to Statistics Netherlands after the calculation of the definite indices. The 2000=100 series is also rescaled to 2005=100 to simplify the comparison with the new series.

The developments in both series is practically the same. Both series increase and decrease at the same time. At the end of the series the difference between the two is 0.1 of an index point. The average variance between the two series is 0.17 of an index point

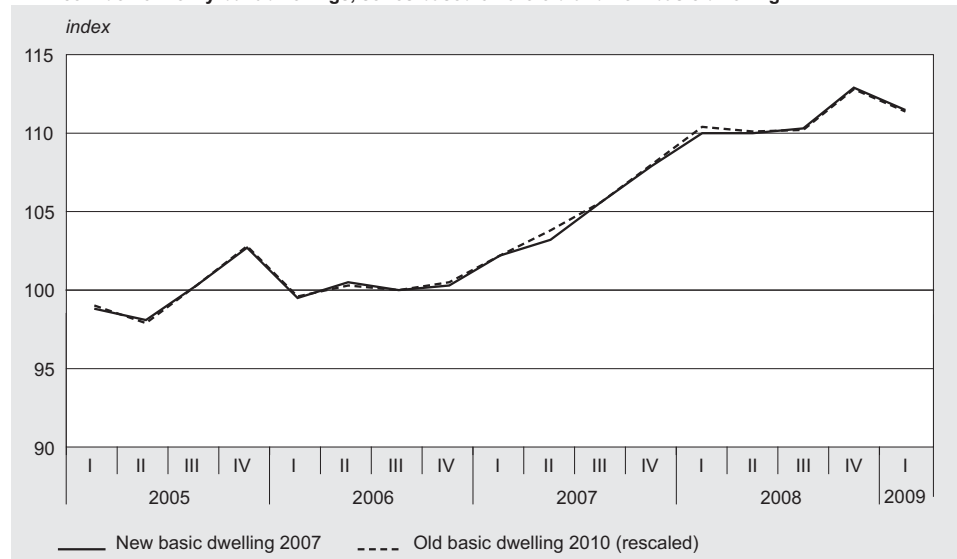
**Table 1**  
Basic dwelling of 2000 and 2007

	2000	2007
Volume of dwelling in cubic metres	494	529
Number of dwellings in project	62	51
<b>Type of soil</b>		
Sand, Wadden Sea, hills, dunes	0.45	0.53
Fenland	0.10	0.10
River areas	0.12	0.10
Sea clay soil	0.31	0.25
Tidal areas, Zeeland and enclosed sea inlets	0.02	0.03
<b>Category of commissioning party</b>		
Government and housing corporations	0.14	0.22
Commercial developers and corporate investors	0.67	0.64
Private persons and others	0.19	0.14
<b>Market sector</b>		
Rental	0.14	0.18
Owner-occupied	0.86	0.82

N.B. The variables 'Volume of dwelling in cubic metres' and 'Number of dwellings in project' are included in the index calculation as the logarithm of their means. The other variables are changed into dummy variables, i.e. they have a value of 0 or 1 (present or not present).  
The means in the sub categories type of soil, category of commissioning party and market sector represent the proportional share of the value within a category.

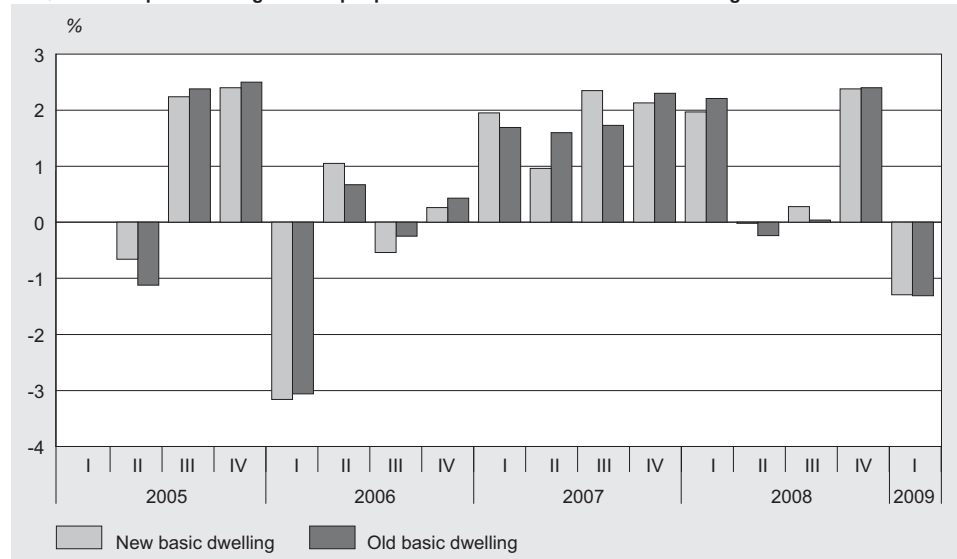
with a peak of 0.6 of an index point in mid 2007. The differences between the developments are caused exclusively by the new defined basic dwelling. Graph 2 shows the differences in quarter-on-quarter changes between the old and the new basic dwelling.

**1. Price index of newly built dwellings, series based on the old and new basic dwelling**



Bron: CBS.

**2. Quarter-on-quarter changes in output price index of old and new basic dwelling**



Bron: CBS.

#### 4. Quality correction and price development O-PINW

The new basic dwelling is an average dwelling which meets the building regulations and requirements of base year 2007. Nevertheless, the series has been calculated since 2005, based on building licences issued in 2005. On 1 January 2006 new regulations were introduced for newly built dwellings, as a result of which new dwellings were no longer comparable in terms of quality with dwellings built before this date. To overcome this problem, the quality of dwellings built in 2005 and 2006 have been upgraded to the quality level of the basic dwelling of 2007. Because not all building permits immediately complied with the new requirements on 1 January 2006, the quality correction was introduced in steps according to the timetable below.

**Table 2**  
**Quality corrections as a result of new building regulations of 01-01-2006**

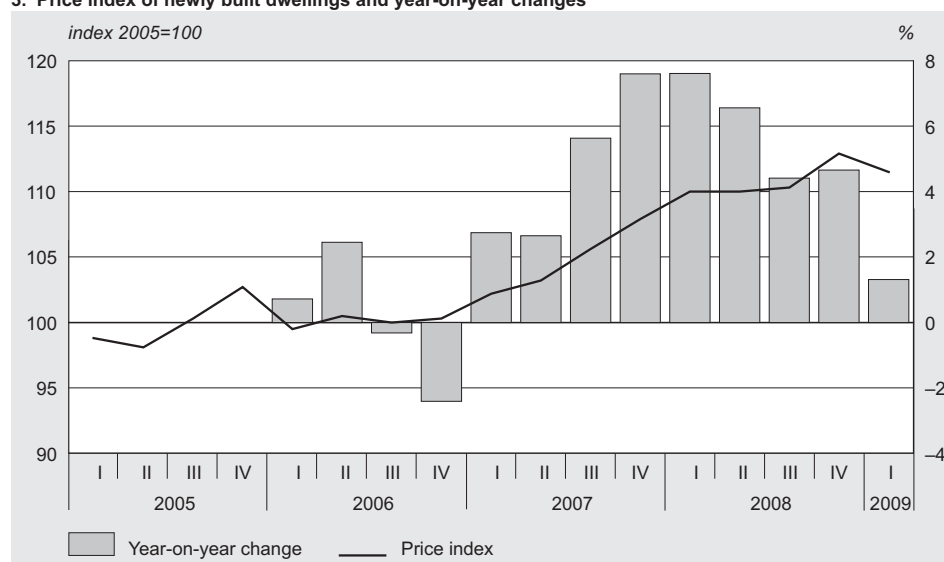
Period	% to correct
1st quarter 2005 to 4th quarter 2005	100
1st quarter 2006	90
2nd quarter 2006	60
3rd quarter 2006	30
4th quarter 2006 and later	0

The right-hand column shows the percentage dwellings of which the price must be corrected in terms of quality. However, for practical reasons we chose to correct the building costs of all dwellings by the same percentage (i.e. instead of correcting 10 percent of all dwellings by 100 percent, we corrected 100 percent of all dwellings by 10 percent).

As the dataset did not change, the hedonic model was not modified.

Graph 3 shows the new series 2005=100 together with the year-on-year changes. The quality correction for 2005 and 2006 has been implemented in this series.

### 3. Price index of newly built dwellings and year-on-year changes



Bron: CBS.

A last remark about the published price indices. Starting from the 2005=100 series price indices are published to 1 decimal. The reason for this is that the year-on-year changes are also published to 1 decimal.

### 5. The transition from reference year 2000=100 to 2005=100

At the same time as the publication of the new figure for the first quarter of 2009, the figures for the series 2000=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 will only be available on the basis of 2005=100.

For administrative applications of the O-PINW (for example in contracts), Statistics Netherlands advises users to adhere to the following recommendations:

- Calculate price developments as much as possible within one series.
- Avoid ex post adjustments and corrections as much as possible.

Further recommendations:

- The calculation of a price change in a period starting in or after the first quarter of 2000 and ending no later than the fourth quarter of 2008 is based on the series 2000=100.
- The calculation of a price change in a period starting in or after the first quarter of 2005 and ending no later than the fourth quarter of 2008 is based on the series 2005=100.
- The calculation of a price change in a period starting between the first quarter of 2000 and the fourth quarter of 2004, and ending after the last quarter of 2008 is based on the linked series 2000=100. From the first quarter of 2009 the percentage change compared with the last quarter of 2008 must be calculated on base 2005=100, as the price index for the last quarter of 2008 is the last figure published on base 2000=100; this change must then be adjusted to the results for the last quarter of 2008 of the series 2000=100 (see example).

**Table 3**  
**Example of linking the different index series**

Index series	2008	2009
	4th quarter	1st quarter
2000 = 100	140.2	.
2005 = 100	112.9	111.5
Linked series 2000 = 100	140.2	138.5

N.B. The price index numbers in the table are provisional.

The index for the first quarter of 2009 of the linked series is calculated by calculating the difference between the fourth quarter of 2008 and the first quarter of 2009 according to the series on 2005=100 and multiplying this by the index for the fourth quarter of 2008 according to the series 2000=100. In the example:  $(111.5/112.9) * 140.2=138.5$  (rounded).

For the second quarter of 2009, the index is calculated analogously, where the figures for the last quarter of 2008 must be used for the link because of rounding problems.

If you have any questions please contact the infoservice of Statistics Netherlands (<http://www.cbs.nl/infoservice>).