Official Statistics of Norway D 372

Construction Price Indices and House and Property Price Indices 2006

Results and methods

Statistisk sentralbyrå • Statistics Norway
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Official Statistics of Norway

This series consists mainly of primary statistics, statistics from statistical accounting systems and results of special censuses and surveys. The series is intended to serve reference and documentation purposes. The presentation is basically in the form of tables, figures and necessary information about data, collection and processing methods, in addition to concepts and definitions. A short overview of the main results is also included

The series also includes the publications Statistical Yearbook of Norway and Svalbard Statistics

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Preface

This publication provides an overall view of construction price indices and house and property price indices compiled by Statistics Norway. This is a relatively new field of statistics production for Statistics Norway, and this publication is the first joint presentation of results and methods. The indices described are construction cost indices, output and seller's selling price indices for new residential buildings, house price indices and price indices for office and business properties. Apart from the construction cost indices, which have been published since 1978, all of the indices have been developed during the last 17 years.

Importance is given to documenting the calculation methods and describing the comparability between the indices. The main trends of the prices during the last years are described. Tables with yearly figures dating back to the first year of publishing are attached. More detailed statistics are available on the Internet and the relevant web addresses are listed in the appendix.

Arild Thomassen has prepared the publication. Responsible for the publication is Head of Division Roger Jensen, Division for Construction and Service Statistics.

Statistics Norway
Oslo/Kongsvinger 24 January 2007

Øystein Olsen

Nils Håvard Lund

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1. Introduction

The purpose of this publication is to provide an overview of price indices for construction activities and for the housing and property market, compiled by Statistics Norway. Importance is attached to the methods and data sources. In addition, the relations and the comparability between the indices are looked into.

The indices are:

1. Construction cost index for residential buildings
2. Construction cost index for plumbing work in office and commercial buildings
3. Construction cost index for civil engineering works
4. Cost index for maintenance of roads
5. Price index for new detached houses
6. Price index for new multi-dwelling houses
7. House price index
8. Price index for office and business properties

Reading guidelines

Construction price indices can be grouped into three main types: input price indices, output price indices and seller's price indices. Statistics Norway is producing construction cost indices and price indices for new houses in order to monitor the production prices in the construction industry.

In chapter 2, the composition of the price indices compiled by Statistics Norway is compared with the three main types of construction price indices.

To trace price movement in the house and other property markets, Statistics Norway compiles house price indices, and a price index for office and business properties.

The construction cost indices are compiled using the standard factor method. The price indices are compiled by using the hedonic method. These methods are described briefly in chapter 3. The background and purpose, data sources and calculation for each index are described in chapters 5-9.

Chapter 4 presents developments of construction and house prices in Norway over the last 15-25 years.

Other price statistics

In addition to price indices, Statistics Norway provides statistics on the sale of real estate in Norway, including purchase prices for dwelling properties, with building and free market sales. The statistics are based on data from two governmental administrative registers: the Register of Deeds ("Grunnboka") and the Ground Property, Address and Building Register (GAB). The Norwegian Mapping Authority has been managing the latter register for many years and is now gradually taking over the management of the Register of Deeds from the local courts. The present level of detail has been maintained since 1991. With fewer details, the statistics go back to 1836. However, no statistics are available for the years 1981-1983.

The statistics comprise all registered transfers of real estate and not only real sales. In addition to sales on the free market, the statistics also include donations, forced sales, expropriations, and other registered transfers of title. The statistics include three types of real estate: parcels, leases and sections of buildings registered as freehold. For more information, go to *www.ssb.no/eiendomsoms_en.*

2. Types of construction price indices

This chapter briefly describes the three main types of construction price indices: input price indices, output price indices and seller's price index (OECD, Eurostat 1997). Further, it describes how the construction price indices compiled by Statistics Norway fit into these concepts.

Input price indices

Input price indices measure changes in the price of inputs to the construction process by monitoring separately the costs of labour, materials, machinery, transport, energy and other costs. An input price index is a weighted index of price indices for a representative basket of input elements. The weights are based on representative construction projects and have to be renewed every 10-15 years.

Input price indices do not include the changes in productivity, profit and trade margins of the construction contractor. Statistics Norway's construction cost indices (Chapter 5) are input price indices.

Output price indices

Output price indices are producer price indices for the construction industry. They measure changes in prices paid by clients or purchasers to entities producing construction output. Output price indices take into account changes in productivity, and contractors' profit margins in addition to the input costs. These indices are used to deflate the output value of the construction industry in the national accounts.

Output price indices do not include architects and engineers' fees, finance costs, selling expenses, VAT or the cost of the land. Statistics Norway's price index for new detached houses (Chapter 6) is an output price index with one exception; it includes VAT.

Seller's price indices

Seller's price indices measure changes in the prices of construction output paid by the purchaser or the final owner of the construction product. Seller's price include all costs of completed construction including architects and engineers' fees, finance costs, selling expenses, client profits, VAT and the cost of the land.

Statistics Norway's price index for new multi-dwelling houses (Chapter 7) is compiled as a seller's price index, excluding the cost of land. The indices for detached houses and multi-dwelling houses include different item coverage because they are based on different types of data sources.

3. Methods

3.1. Standard factors method

Construction cost indices are compiled using standard factors method

Indices compiled using the standard factors method measure the changes in average construction costs compared with a base year. The method assumes that the quality of the construction, construction techniques and the organisation remain unchanged.

Construction projects are divided into production factors i.e. labour, materials, machinery, transport, energy etc. Changes in construction costs are measured by monitoring the price of each component.
To establish the share of total costs (the weights) for input factors and their components, calculations and accounts of representative construction projects can be used. The weights have to be revised after a period of 10-15 years in order to remain current with new trends in the construction activity.

The method gains an advantage from the fact that a major part of input elements are common in different types of constructions. In addition, price indices for many of the input factors are already available.

The aim of the construction cost indices is to measure the costs incurred by the contractor/producer carrying out the construction activity. A limitation of the standard factor method is that quality changes and changes in productivity are not taken into account.

3.2. The hedonic method

The price indices are calculated using the hedonic method

Norway uses the hedonic method in the compilation of the output price indices, the house price indices and the price index for office and business properties. The method is based on prices set by the market for houses or commercial buildings and regression analysis, which describe the relation between the prices and the different characteristics of the buildings. This approach starts on the assumption that there is a connection between the overall prices at a given time and the characteristics of the object. This connection should be described using a function with the price as the dependent variable and quality characteristics that influence the prices as explanatory variables. Statistics Norway's work with this method is mainly based on Rosen's model description and Wigren's examination of house prices in Sweden. (Rosen 1974, Wigren 1986)

Two important questions arise with regard to calculating hedonic price functions. Which characteristics should the function possess, and which form of function should be chosen. Choosing the type of function is also an empirical question. Wigren assumes that the connection between the prices of house *i* during a period of time *t*, $P_{\mathrm{i}}^{\mathrm{t}}$, and the house's qualitative characteristics can be expressed stochastically as

$$P_t^i = F_t(x_t^{1i},....x_t^{mi},\varepsilon_t^i) \qquad i = 1,.....,n \tag{3.1}$$

Where P_t^i is the price for object *i* in period *t*, x_t^{ji} are the characteristics, also called explanatory variables, $(j = 1,....,m)$ for object *i* in period *t*, ε_t^i is random error and *n* is the number of objects. Assuming the same variation of prices in period *t* and in the base period, we can ignore the error term. (Lillegård 1994, Goldberg 1968)

Characteristics can be numeric variables or classification variables. The classification variables have the value 1 or 0 according to whether they are part of the class or not.

Rosen and Wigren are both of the opinion that the price equation is multiplicative. It should furthermore have second order derivatives. By choosing a specific equation form, the partial derivatives can be estimated, i.e. the hedonic prices. Empirical studies in Sweden and the United States show that a logarithmical form of the price equation is the most suitable for multiple regressions. The regression analysis determines the significance of the variables and estimates their coefficients.

The hedonic method will, to some extent, tend to overestimate the increase in prices when construction quality is improving. This depends on how many characteristics of construction the regression model includes.

4. Changes in construction costs and house prices

4.1. Construction costs

Residential buildings

Since Statistics Norway started compiling construction costs for residential buildings in 1978, the costs have more than tripled. In the same period, the consumer index has increased correspondingly, but with a stronger growth in the early eighties and more moderate price rises in the new millennium.

The construction cost indices for wooden detached houses and for multi-dwelling houses are mostly following each other very closely. (Figure 4.1) However, in recent years, the cost of building multi-dwelling houses (blocks of flats) has increased more because of a strong increase in steel prices.

Figure 4.1. Construction cost indices for detached houses and multi-dwelling houses. Consumer price index (CPI). 1978=100

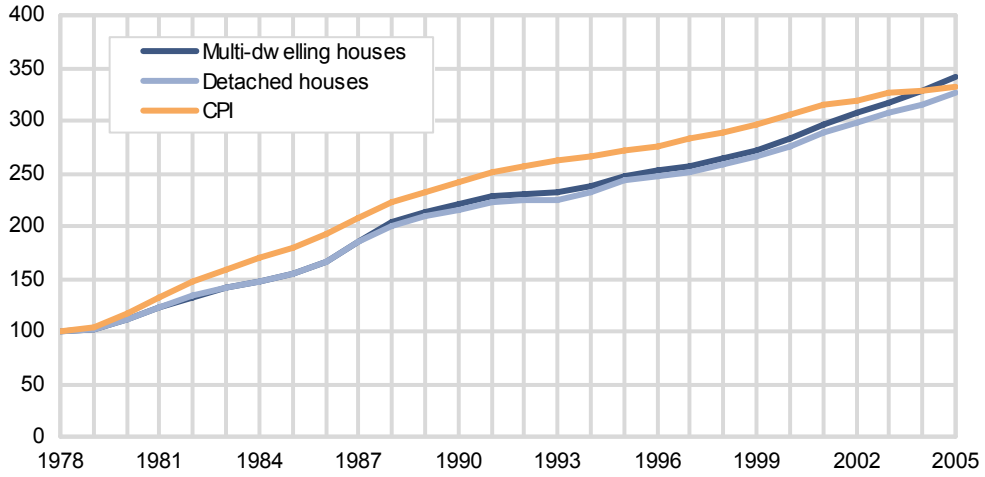
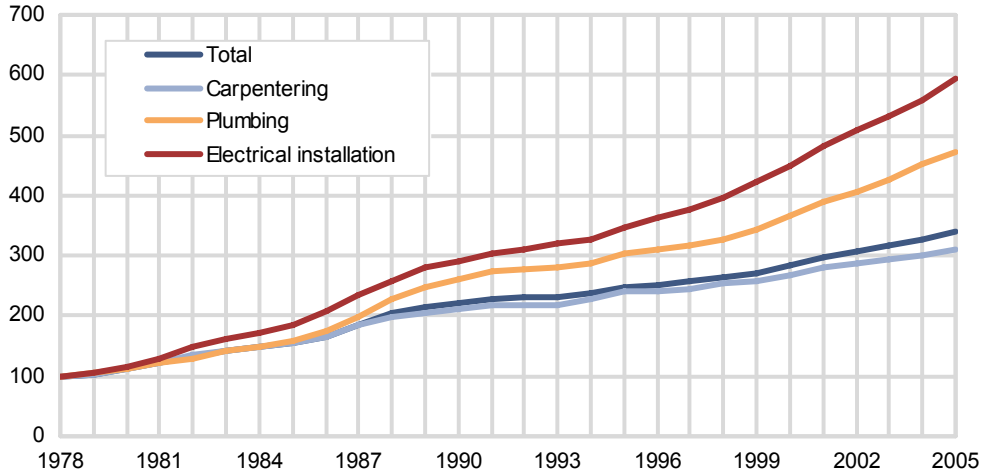


Figure 4.2. Construction cost index for multi-dwelling houses. Indices for carpentry, plumbing and electrical installation. 1978=100



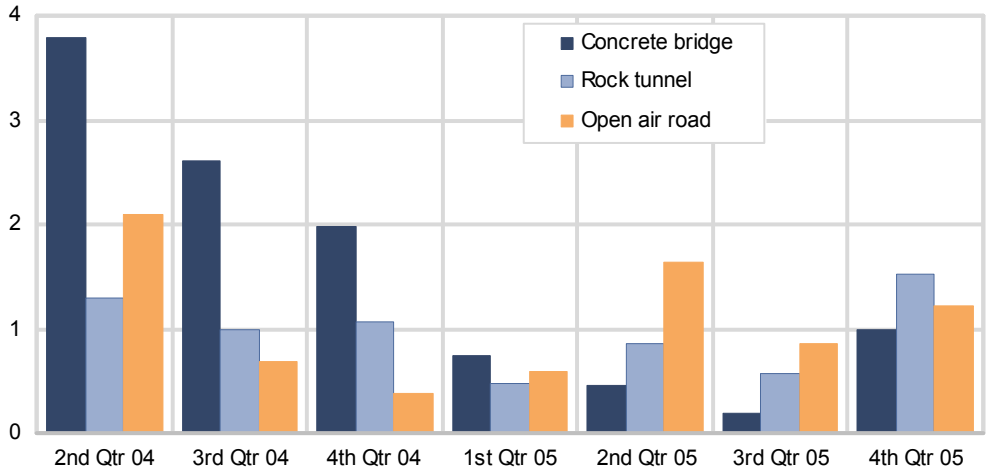
Installation costs increased the most

The costs of plumbing and electrical installation have increased the most and considerably more than other types of building works. (Figure 4.2.) A strong rise in plumbing and electrical material costs are contributing factors.

Civil engineering works

The construction cost indices are used to regulate contracts. Therefore, it is important that they reflect price changes in short periods of time correctly. Figure 4.3 shows great variation in cost changes between different types of civil engineering works in 2004 and in 2005. A strong increase in the construction costs for concrete bridges occurred in 2004, caused by higher steel prices. In the second quarter of 2005, higher oil prices increased the costs of building asphalt roads.

Figure 4.3. Construction cost indices for road constructions. Indices for concrete bridges, rock tunnels and open air roads. Change in per cent from previous quarter.



4.2. Prices of new houses

Detached houses

The prices of new detached houses in 2005 are nearly twice as high as in 1989, when Statistics Norway started compiling these indices. By comparison, the contractor costs for labour, materials, machinery, transport and other input factors have increased by 50 per cent in the same period. (Figure 4.4.) The building costs have had a relatively stable increase over the years, while the output prices are influenced by the market conditions.

Multi-dwelling houses

The prices of new multi-dwelling houses have increased more than the prices of detached houses since Statistics Norway started compiling the price index for new multi-dwelling houses in 2000. (Figure 4.5.) An increased demand after dwellings in blocks of flats has contributed to this development.

Figure 4.4. Price index for new detached houses. Construction cost index for detached houses. 1989=100

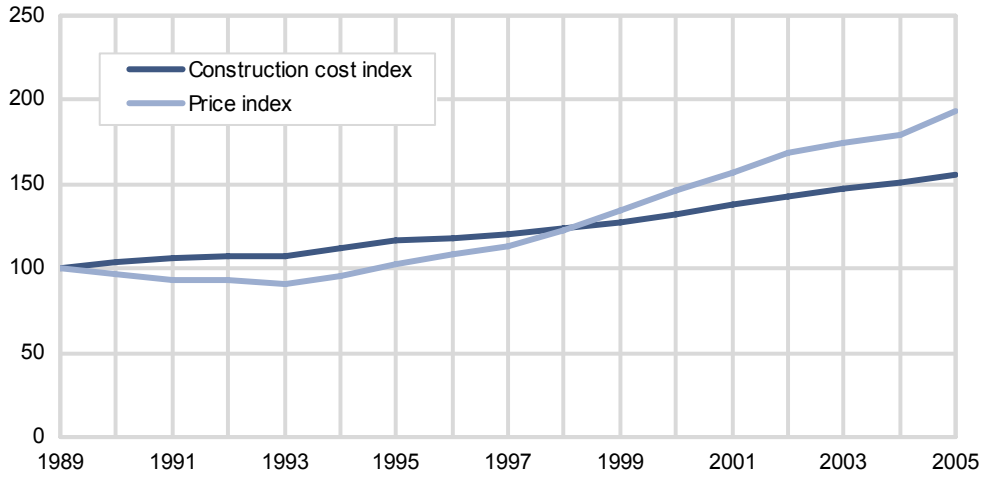
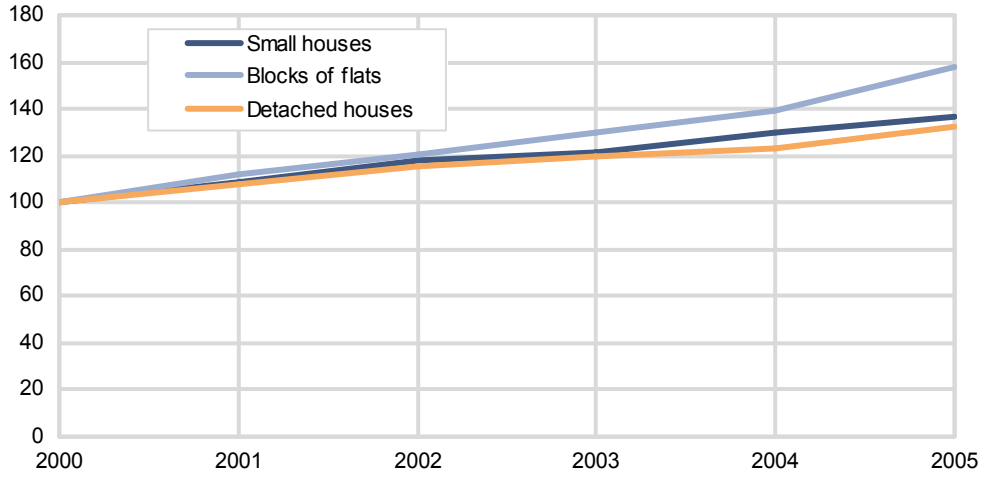


Figure 4.5. Price indices for new detached houses and new multi-dwelling houses. 2000=100



4.3. Prices of house and business properties

Considerable regional differences

There have been stable and strong rises in house prices since the lowest level in 1992. The largest increases are recorded in Oslo and in the major cities of Stavanger, Bergen and Trondheim. (Figure 4.6.) In Oslo, the house prices are nearly four times higher in 2005 compared with 1992.

Since 1996, prices of office and business properties have increased by almost 93 per cent, while house prices rose by almost 125 per cent during the same period. Figure 4.7 shows that the prices of commercial buildings are more sensitive to fluctuations in the general economic market.

Figure 4.6. House price indices by type of region. First quarter of 1992=100

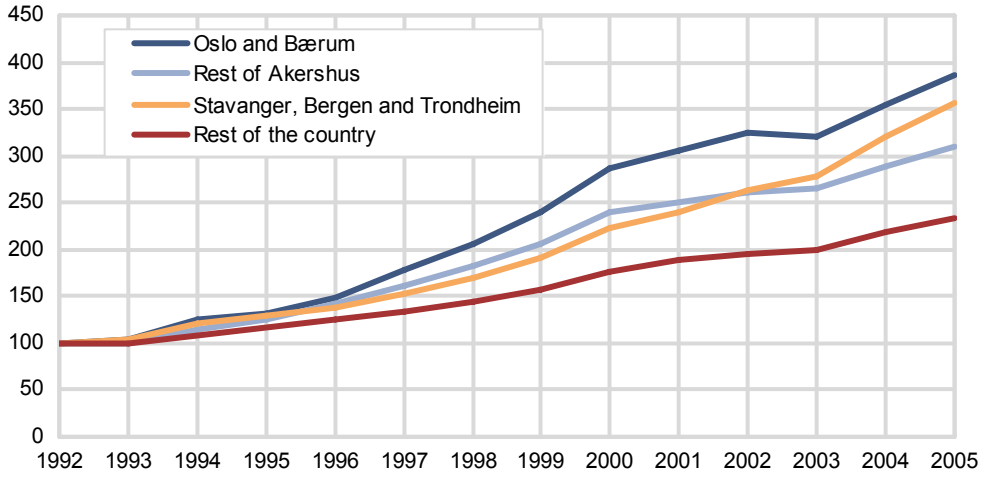
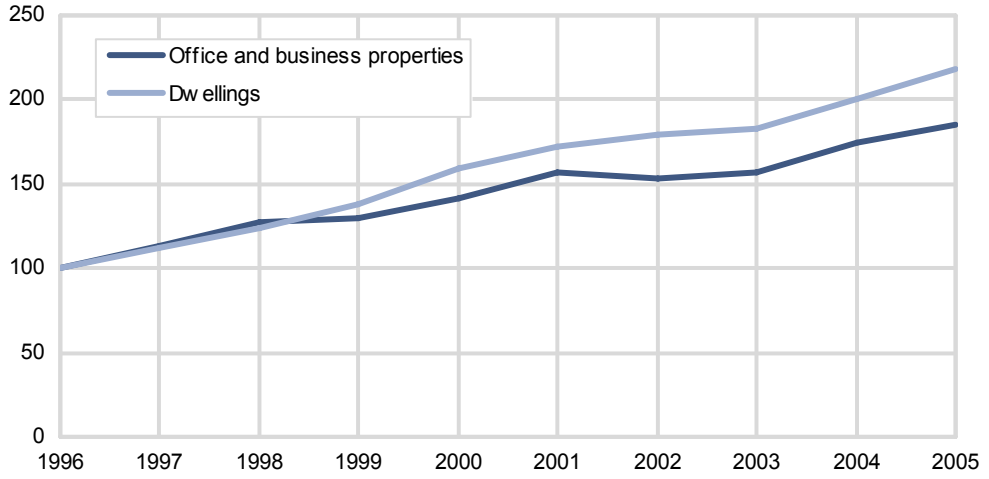


Figure 4.7. Price index for office and business properties. House price index. 1996=100



5. Construction cost indices

5.1. Background and purpose

Purpose and history

Regulating construction contracts with construction cost indices has a long tradition in Norway. In 1932, a building materials supplier published the first index for the construction markets.

Statistics Norway began compiling the first official construction cost index for residential buildings in 1978. Indices for three types of residential houses were compiled: detached houses of wood, row houses of wood and multi-dwelling houses. In 1985, Statistics Norway began compiling construction indices for road works. Since 1998, Statistics Norway has also published a construction cost index for plumbing work in office and commercial buildings, financed by the Norwegian Association of Plumbing, Heating and Ventilating Contractors.

Construction cost indices are, in addition to regulating contracts, used to estimate output prices to deflate national accounts and to estimate the output of construction activities.

Essential changes

The weights used to compile the construction cost indices for residential buildings were renewed in 1990 and 2000. In 2000, the number of residential indices was reduced from three to two: an index for detached houses and an index for multi-dwelling houses. The reason is that the weights for detached houses of wood can also be used for other types of small houses with the same use of materials, like row houses, dual dwelling houses etc.

Since 2000, Statistics Norway has published a total index for residential buildings by weighting together the index for detached houses and the index for multi-dwelling houses.

The weights used to compile the construction cost indices for road works were revised in 2004. Simultaneous to this, Statistics Norway carried out changes in the index production. In addition to the total index for road works, two new indices were published; the construction cost index for open air roads and the construction cost index for rock tunnels. The former construction cost index for bridges and quays was replaced by the index for concrete bridges. The number of maintenance indices was reduced to three, i.e. the maintenance of roads total index, the index for asphalt work and the index for maintenance in wintertime.

5.2. Types of construction covered

Monthly indices for residential buildings

The construction cost index for residential buildings is a monthly index. Statistics Norway publishes a total index and indices for two main types of residential buildings: detached houses of wood and multi-dwelling houses (blocks of flats). In addition, indices for several kinds of construction work such as site preparation, carpentry, painting, wallpaper hanging and floor coating, plumbing and electrical installation are calculated.

Monthly indices for plumbing works

In addition to a total construction cost index for plumbing works in office and commercial buildings, indices for sanitary installations and heating installations are calculated.

Quarterly indices for civil engineering works

The quarterly cost index for road constructions covers a total index and indices for open air roads, concrete bridges and rock tunnels. Quarterly cost indices for total maintenance of roads, asphalt works and maintenance in wintertime are also calculated.

Indices for cost elements

All indices include the costs of labour, materials, machinery, transport, management on the site and the share of main office overheads. Indices are available for labour costs, material costs and machinery costs.

5.3. Concepts, variables and classifications

Weighting system

The weighting system gives a summery of the representative goods and services, input factors and types of construction works and their share of the total costs (weights).

Representative goods and services

Representative goods and services is the smallest component in the weighting system; it is the components we actually are collecting prices for. It can be types of material, category of worker, machine types, types of lorries etc.

Input factors

The cost elements in the weighting system are grouped into five input factors:

- Labour
- Materials
- Machinery, exclusive of driver salaries
- Transport, inclusive of driver salaries
- Other costs

A small exception is made in the weighting system for plumbing works in office and commercial buildings. (5.5.2)

Type of constructions works

The construction costs are divided into types of works, following the standard categories of the construction industry. Statistics Norway publishes cost indices for several types of construction works.

Price

Actual transaction prices, dated on the 15th of each month and exclusive of VAT.

5.4. Index formula

The construction cost indices are calculated as fixed base-weighted Laspeyres indices. If n is the number of items we are collecting prices for, the Laspeyres index formula is as follows:

$$I_{0,t} = \frac{\sum_{i=1}^{n} P_t^i Q_0^i}{\sum_{i=1}^{n} P_0^i Q_0^i} \tag{5.1}$$

where

P_0^i, P_t^i are the prices in base period 0 and survey period t of the item i

Q_0^i is the quantity of item i in base period 0

The value (cost) and the value share for item i in base period, can be described as respectively:

$V_0^i = P_0^i Q_0^i$ the price per item multiplied with the number of items (quantity)

and

$w_0^i = \frac{V_0^i}{\sum_{j=1}^{n} V_0^j}$ the value of item i divided with the total value of all items.

The index formula (5.1) can then be expressed as follows

(5.2)

$$I_{0,t} = \frac{\sum_{i=1}^{n} P_0^i Q_0^i \frac{P_t^i}{P_0^i}}{\sum_{j=1}^{n} P_0^j Q_0^j} = \frac{\sum_{i=1}^{n} V_0^i \frac{P_t^i}{P_0^i}}{\sum_{j=1}^{n} V_0^j} = \sum_{i=1}^{n} \frac{V_0^i}{\sum_{j=1}^{n} V_0^j} \frac{P_t^i}{P_0^i} = \sum_{i=1}^{n} w_0^i I_{0,t}^i$$

where

$I_{0,t}^i = \frac{P_t^i}{P_0^i}$ is the price index of item *i.*

Formula (5.2) expresses that to calculate the construction cost indices, we have to know the price index for every item and their value shares (weights) in the base period.

Updating of weights

When the weights are updated in period $t._{rev}$, new figures are calculated and chained with figures calculated with old weights. Formula (5.3) expresses chained index $I_t^{chained}$ for period *t*.

(5.3) $$I_t^{chained} = \frac{I_{t.rev}^{old}}{I_{t.rev}^{new}} I_t^{new}$$

where $I_{t.rev}^{old}$ and $I_{t.rev}^{new}$ are indices calculated with old and new weights respectively and I_t^{new} is the index for period *t* calculated with new weights.

The total indices and indices for types of building or civil engineering works are chained separately. Chained total indices are therefore not a weighted sum of the indices for breakdowns by type of work or by cost elements.

5.5. Sources of data, compilation and weights

5.5.1. Cost index for residential buildings

Labour costs

Labour costs are broken down into two components:

- Cash compensation for hours worked
- Other labour costs

The relation between these components is based on figures from the Federation of Norwegian Construction Industries. Cash compensation for hours worked is regulated quarterly with Statistics Norway's wage index on average basic paid salaries. For this purpose, wage indices for several types of construction works are calculated. Average basic paid salaries exclude irregular payments, bonuses, commissions and such like. Average basic paid salaries are calculated at the end of the statistics quarter**,** in other words on a certain date and not as an average through the entire quarter.

Other labour costs are regulated yearly for changes in taxes, working days, working hours, expenditures on public holidays and such like.

More information about Statistic Norway's wage index: *www.ssb.no/lonnkvart_en*.

Machinery costs Excavator costs are regulated with an excavator index calculated by The Norwegian University of Science and Technology (NTNU) for Statistics Norway. Crane costs and mobile crane costs are regulated by changes in the costs of renting such machinery. The rental prices are collected in a monthly survey. The expenses of concrete pumps are regulated by the change in purchase prices.

Transport costs The transport costs are regulated with the cost index for road goods transport compiled by Statistics Norway. The cost index for road goods transport is published monthly and entered in the construction cost index of residential buildings with a delay of one month.

More information about Statistic Norway's cost index for road goods transport: *www.ssb.no/kilt_en*

Material costs A sample of 400 suppliers to the construction industry (mainly wholesale companies) provide about 3 800 price observations every month. The material prices are collected by means of questionnaires, which are sent to the outlets on the 12th of each month, and returned to Statistics Norway 10 days later.

The population is all wholesales and production companies supplying materials to the construction industry. The local kind-of-activity units are drawn from Norway's Business Register and stratified on industrial classifications, turnover and regions.

The prices are put through tests, which identify observations with large price changes from the previous month. Prices are also checked when sorted by item and when items are aggregated into groups. Sub-indices and item-indices are checked against time-series that are published earlier and comparisons with other statistics.

Other costs Other costs include general expenses such as provision of power supply, provision of site office, mess room and other accommodation for the workers, temporary scaffolding and formwork, share of main office overheads.

The costs of site offices and mess rooms, temporary scaffolding and formwork are regulated by changes in the costs of renting those items. The rental prices are collected in a monthly survey. The consumer price index for electricity is used to monitor the power costs. The office overheads are regulated with the consumer price index exclusive of food and clothing.

Calculation The calculation process can be divided into three steps:

- First, price indices are computed for all representative goods and services.
- Second, cost indices for types of construction works, input factors, detached houses and multi-dwelling houses are calculated using formula (5.2).
- Finally, the total construction cost index for residential buildings is calculated. The overall building cost index comprises the two indices for detached houses and multi-dwelling houses. The weights are the square metre utility floor space started multiplied with the average price per square metre utility floor space. The weights are revised every year.

In the first step, the price indices for materials, based on the monthly survey, are calculated as follows. The country is divided into four regions. Within a region, the supplier weights are equal. A regional price index for every representative material is computed:

(5.4.) $\tilde{\tilde{I}}_{0,t}^{i,q} = \frac{1}{n_{i,q}} \sum_{j \in \text{sup}\,plier} \frac{P_t^{i,j,q}}{P_0^{i,j,q}}$ is the price index for material *i* in region *q*.

Regional weighting of material costs

The overall price indices are estimated by using regional weights. The region's share of the total sale, for the supplier's industrial group, is used as weights:

$$\hat{I}^{i}_{0,t} = \sum_{q=1}^{4} \hat{w}^{i,q} \tilde{\hat{I}}^{i,q}_{0,t} \qquad (5.5.)$$

where

$$\hat{w}^{i,q} = \frac{O^{d,q}}{\sum_{z \in region} O^{d,z}}$$

is the weight of industrial group d in region q

The sales figures are collected from the Central Register of Establishments and Enterprises, and are updated every second year.

Reference population and weights

For multi-dwelling houses, the weights are based on calculations of seven representative four stories blocks of flats built in the period between 1995 and 1997. For detached houses, the weights are based on calculations of four representative objects from 1997. Available statistics give background information on average size, standard, regional dispersion etc. (Thomassen 2000)

5.1. Weighting of detached houses. Type of construction works and input factors. Per thousand

Type of works	Input factor					
	Total	Labour	Materials	Machinery	Transport	Other Costs
Total	**1 000.0**	**383.0**	**516.5**	**23.5**	**21.5**	**55.5**
Main office overhead	63.0	38.0				25.0
Managing on site	17.0	17.0				
Earthworks	57.0	21.5	10.0	21.0	2.0	2.5
Concrete works	76.0	29.0	41.0	2.5	3.5	
Masonry	26.0	11.5	12,5		1.0	1.0
Carpentry[1]	576.0	196.0	351.0		12.0	17.0
Painting, wallpaper, floor coating	56.0	23.0	29.0		1.0	3.0
Plumbing	66.0	22.0	38.0		1.0	5.0
Ventilation	12.0	3.0	9.0			
Electrical installation	51.0	22.0	26.0		1.0	2.0

[1] Including sheet metal work

5.2. Weighting of multi-dwelling houses. Type of construction works and input factors. Per thousand

Type of works	Input factor					
	Total	Labour	Materials	Machi-nery	Transport	Other Costs
Total	**1000**	**419.5**	**379.5**	**47.5**	**57.0**	**96.5**
Main office overhead	55.0	33.0				22.0
Managing and provision on site	165.0	96.0	12.5	13.0	11.0	32.5
Earthwork	88.0	25.5	11.0	28.5	19.5	3.5
Concrete work	124.0	64.0	50.0		4.0	6.0
Prefabricated concrete panels	78.0	11.0	54.0	6.0	5.0	2.0
Steel and metal work	33.0	7.0	23.5		1.0	1.5
Weatherproofing	18.0	5.0	10.0		1.0	2.0
Masonry	40.0	18.0	16.0		2.0	4.0
Carpentry	210.0	79.5	114.0		8.0	8.5
Sheet metal work	9.0	5.0	2.5		0.5	1.0
Painting, wallpaper, floor coating	35.0	17.0	14.0		1.0	3.0
Plumbing	51.0	16.5	30.0		1.0	3.5
Ventilation	14.0	6.5	6.0		1.0	0.5
Electrical installation	52.0	23.0	24.0		1.0	4.0
Lift	28.0	12.5	12.0		1.0	2.5

5.5.2. Cost index for plumbing works in office and commercial buildings

Administration costs

In this index, administration costs are specified as an input factor, including overheads and wages for the administration staff. The overheads are regulated with the consumer price index exclusive of food and clothing. The wages are regulated quarterly with Statistics Norway's wage index on average basic paid salaries.

Labour and transport costs

Labour costs and transport costs are obtained from the same sources as described for residential houses.

Material costs

Material prices are collected from three dominating wholesale enterprises. They cover about 90 per cent of the Norwegian market of plumbing materials. The prices are weighted with the enterprise's share of the total turnover.

Calculation

The calculation process can be divided into two steps:

- First, price indices are computed for all representative goods and services.
- Second, cost indices for plumbing works total, sanitary installation, heating installation, cost elements as labour, materials and administration are calculated using formula (5.2).

The price indices for materials are calculated by using the supplier's share of total sales as weights:

$$\hat{I}^{i}_{0,t} = \sum_{j \in \sup\ plier} \frac{O^{i,j}}{\sum_{k \in \sup\ pleier} O^{i,k}} \frac{P^{i,j}_{t}}{P^{i,j}_{0}} = \sum_{j \in \sup\ pleier} \hat{w}^{i,j} \frac{P^{i,j}_{t}}{P^{i,j}_{0}} \tag{5.6.}$$

where

$\hat{w}^{i,j} = \dfrac{O^{i,j}}{\sum_{k \in \sup\ pleier} O^{i,k}}$ is the weight of material *i* for supplier *j*.

The supplier's share of total sales is updated yearly.

Reference population and weights

The weights are compiled on the basis of calculations of four office and commercial buildings built in the period 1995-1996. (Thomassen 2000) The plumbing works are divided into sanitary and heating installations. The cost elements are grouped into four input factors:

- Administration, divided into
  - General overhead expenses (50%)
  - Management wages. (50%)
- Labour
- Materials
- Transport

5.3. Weighting of plumbing works in office and commercial buildings. Type of construction works and input factors. Per cent

Type of works	Input factor				
	Total	Admini-stration	Labour	Materials	Transport
Plumbing works total	**100.0**	**17.3**	**26**	**55.3**	**1.4**
Sanitary installations	54.5	8.4	12.6	32.7	0.8
Heating installations	45.5	8.9	13.4	22.6	0.6

5.5.3. Cost index for civil engineering works

Labour costs

The data on labour costs are taken from the quarterly labour cost statistics compiled by Statistics Norway. Generally, the labour cost indices are calculated on the division level of NACE rev.1. For this purpose, an index for typical civil engineering groups of NACE 45 is calculated.

More information about Statistic Norway's labour cost indices*: www.ssb.no/aki_en*

Machinery costs

The machinery indices are obtained from machinery indices compiled by The Norwegian University of Science and Technology (NTNU) for Statistics Norway. The NTNU calculates indices for several types of machinery: excavators, bulldozers, road graders etc. Cost indices for machinery used on asphalt works and winter maintenance are calculated by Statistics Norway. Crane costs and mobile crane costs are regulated by changes in the costs of renting such machinery. The machinery indices published are calculated exclusive of driver salaries.

Transport costs

Transport costs are obtained from the same sources as described for residential houses.

Material costs

Price data of materials are obtained from the following price indices in Statistics Norway: Construction cost index for residential buildings, Consumer price index and Price index of first-hand domestic sales. In addition, some material prices are obtained exclusively for these statistics by means of questionnaires.

Other costs

Other costs are obtained from the same sources as described for residential houses.

Calculation

The calculation process can be divided into two steps:

- First, price indices are computed for all representative goods and services.
- Second, total cost indices, indices for types of road works and indices for input factors, are calculated using formula (5.2).

The price indices for all representative goods and services are mainly taken from other statistics. However some price indices have to be calculated especially for the civil engineering works indices. These materials and items of machinery usually have a few suppliers. The price indices are therefore calculated by using the supplier's share of total sales as weights using formula (5.6). These weights are updated every three years.

Reference population and weights

For road constructions, the weights are based on calculations and tenders of projects built in the period 1997-2001, and average figures obtained directly from main contractors and subcontractors in the construction industry. The weights attached to each type of road construction (open air road, rock tunnel and concrete bridge) are taken from the Road Directorate accounts from the period of 1998-2002.

The weights for road maintenance are determined according to the Road Directorate's accounts of maintenance and accounts from local road authorities. (Thomassen 2005)

Table 5.4. Weighting of road construction structures. Input factors and selected material groups. Per cent.

Input factors and material groups	Road construction total[1]	Open air road	Rock tunnel	Concrete bridge
Total	**100.0**	**100.0**	**100.0**	**100.0**
Machinery exclusive drivers' salary	19.1	24.5	14.9	8.4
Transport inclusive drivers' salary	7.3	7.8	10.7	2.8
Materials total	30.5	29.0	33.5	31.9
Crushed stone and gravel	6.0	9.3	1.5	1.1
Reinforcement	2.4	0.3	2.2	8.3
Steel profiles, piles	1.8	1.7	0.1	3.4
Products of treated steel	1.3	0.3	4.7	1.2
Concrete	4.9	0.4	10.4	12.1
Concrete products	2.2	2.6	0.6	2.4
Bitumen	2.3	3.5	0.4	0.5
Explosive	2.5	2.1	6.7	0.1
Others	7.2	8.8	6.9	2.8
Other costs	7.5	5.7	7.6	12.2

[1] The weights of road total = open road x 0.59 + Rock tunnel x 0.19 + concrete bridge x 0.22

Table 5.5. Weighting of maintenance of roads. Input factors and selected material groups. Per cent.

Input factors and material groups	Maintenance of roads total[1]	Asphalt works	Maintenance in winter- time
Total	**100.0**	**100.0**	**100**
Labour	32.1	20.8	12.2
Machinery exclusive drivers' salary	15.0	15.1	19.4
Transport inclusive drivers' salary	26.1	11.2	57.5
Materials total	21.1	48.0	10.3
Crushed stone and gravel	5.3	17.5	3.5
Steel profiles	0.9		
Products of treated steel	0.1		
Concrete products	0.3	0.1	
Bitumen	5.7	23.1	
Salt	1.9		6.8
Others	6.9	7.3	
Other costs	5.7	4.9	0.6

[1] Maintenance of roads total includes asphalt work and maintenance in wintertime with 24 and 28 per cent respectively.

5.6. Sources of error and uncertainty

Measurement and processing errors

The outlets might, for the sake of convenience, copy the previous month's prices instead of entering the correct prices when filling out the questionnaires. The most obvious cases of this kind are revealed in a manual check carried out when receiving the questionnaires. When a product or service is no longer sold, the outlets are instructed to find a replacement and mark it in the questionnaire. If they fail to do so, the difference in price between the old product and the replacement will incorrectly be registered as a price change of the old product.

For some goods, price measurements are based on price lists, and changes in discounts given to building contractors are not taken into account. Other errors are price effects due to changes in relative prices, or where the price ratio between different goods and services has been changed over time and the unsatisfactory handling of quality changes.

Statistics Norway has not initiated separate calculations on the impact of these measuring errors in the building cost indices.

Non-response error

Each month, about one per cent of all questionnaires go missing. Missing prices are imputed. The imputations are based on the average changes in prices from the previous month for the same product.

Sampling errors

Sampling errors such as skewness can occur both in the sample of materials and services in the sample of suppliers. The sample of goods and services is updated every ten years. In addition, products are replaced if an outlet no longer delivers that particular product. Sampling errors are not calculated.

Breach in time series

There is a breach in the time series of construction cost indices for residential buildings in January 2000, in connection with the compilation of new weights. There is also a breach in the time series of construction cost indices for civil engineering works in the first quarter of 2004, in connection with the compilation of new weights.

6. Price index for new detached houses

6.1. Background and purpose

Purpose and history

The price index for new detached houses has been published since 1989 as an initiative by The Norwegian Financial Services Association (FNH). The purpose is to compile an output price index for construction activity. The price index is currently financed by FNH. They use the index to regulate the insurance premium basis for residential buildings.

Norwegian State Housing Bank and other financial institutions use the index to analyse and monitor price/cost changes. Statistics Norway uses the index to estimate output prices to deflate national accounts and to estimate the output of construction activities.

6.2. Publications

Quarterly indices

The price index for new detached houses is published quarterly and only at national level. Statistics Norway also publishes a seasonally-adjusted index.

Prices per square metre

Based on the same data sources, prices per square metre for detached houses including site value are published yearly. One of the purposes is to show the price differences between used and new detached houses. Figures have been published since 1999.

6.3. Sources of data

Data from building register and statistical survey

The data for compiling the price index are obtained from two different sources: the Ground Property, Address and Building Register (GAB), and a quarterly survey. The owner of GAB is the Ministry of Environment, with the Norwegian Mapping Authority being professionally responsible. The County Mapping Offices administer the register system in the districts, and together with each of the municipalities is responsible for entering the data. A firm named Norsk Eiendomsinformasjon as runs the register, and the municipalities provide the necessary information for the B register, based on data supplied by the investors and authorities.

The GAB provides information on dwellings completed during the reference period, and details of the investor (final owner) of the building. In addition, the register contains information on classification and quality variables such as type of building, location and utility floor space.

The questionnaire is distributed quarterly to all investors (final owners) of new detached houses. They give us price information and information about quality characteristics that may have an influence on the price.

The form-based survey is scanned optically. Mathematical and logical controls are incorporated in the data entry procedure. Machine control eliminates houses with very high or low square metre prices or areas.

6.4. Compilation

Hedonic method

The index is compiled using the hedonic method (Chapter 3). A linear regression equation is chosen, with the price per square metre as a dependent variable. One reason for choosing the price per square metre as the dependent variable instead of the price per dwelling, was the problem of heteroscedasticity. It appears that the price variation increases with the size of the dwelling.

Floor space has the greatest influence on the variation in house prices. The relation between the price per square metre and floor space is not linear. The logarithm of

floor space gives approximately a linear relation, and less variance for the estimated coefficient. Other numeric variables are number of bathrooms and number of WCs. Most variables in the equation are dummy variables or classification variables like ground quality, type of heating and ventilation, roofing etc.

Some variables are not directly linked with the quality standards of the houses but to some extent influence the variations in prices. These are factors such as location, category of housing loan, the extent of «self building» work done by the investors etc. These variables are treated as dummy variables.

The equation takes the form:

(6.1) $$P = a + b^1 x^1 + b^2 x^2 + ... + b^n x^n + \varepsilon$$

Where P is the price per square metre, a is the estimated price irrespective of the value of the explanatory variables $x^1 - x^n$ and $b^1 - b^n$ is the price coefficient. The residual ε is a stochastic variable with an expected value of zero.

Paasche index

The price index is calculated according to the Paasche formula with current weights.

(6.2) $$I_{0,t} = \frac{a_t + \sum_{i=1}^{n} b_t^i \overline{x_t^i}}{a_0 + \sum_{i=1}^{n} b_0^i \overline{x_t^i}}$$

where

a_0, a_t is the fixed price element in basis and in period *t*.

b_0^i, b_t^i is the price coefficient for the explanatory variable i in basis and period *t*

$\overline{x_0^i}, \overline{x_t^i}$ is the mean value of the explanatory variable i in basis and period *t*.

Equation 6.2 defines the price index as the price relation between two identical dwellings with the average characteristics of period *t*.

The equation can be transformed into:

(6.3) $$I_{0,t} = \frac{\overline{P}_t}{\overline{P}_0 + \sum_{i=1}^{n} b_0^i (\overline{x_t^i} - \overline{x_0^i})}$$

where $\overline{P}_0 = a_0 + \sum_{i=1}^{n} b_0^i \overline{x_0^i}$ is the average price per square metre in basis.

and $\overline{P}_t = a_t + \sum_{i=1}^{n} b_t^i \overline{x_t^i}$ is the average price per square metre in period *t*.

In equation (6.3), the denominator consists of two components: the average price per square metre in the base period and the price of the difference between the mean values of the explanatory variables in the two periods. In other words, the denominator expresses the price per square metre in the base period of the mean dwelling in period *t*.

Annual chained index

The price index is calculated as a chained index with annual links and the price coefficients are revised yearly. Observations from both the base year and the year before are used in the regression analysis to obtain more confident and stable estimates of the price coefficients. The coefficients are assumed to be constant for that period of time. The shift of the basis takes place in the second quarter of the year with the previous year as the new basis. The chained index for the second quarter of 2005 takes the form:

$$I_{2.q.05}^{chained} = I_{2.q.05}^{newbasis} \frac{I_{1.q.05}^{oldbasis}}{I_{1.q.05}^{newbasis}} \tag{6.4}$$

Seasonal adjustments

The index is adjusted for seasonal variations applying the X12ARIMA method with non-fixed seasonal effects and a multiplicative model. There is no pre-correction of trading day or Easter effects. Pre-correction of extreme values is carried out where these are significant. Analyses show a stable variation over the year with the highest prices for detached houses finished in the second and third quarters.

6.5. Concepts, variables and classifications

Detached houses

Detached houses includes detached houses with a bed-sit or basement flat, but does not include semi-detached house.

Price

The index measures changes in the price per square metre that the investor (final owner) has to pay for a new detached house, excluding site value, or such costs as connection to road, water and sewer services, duties and administrative fees, and interest on building loans. Value added tax is included.

Utility floor space

Utility floor space is the floor area measured within the outer walls.

Price per square metre

Price per square metre is calculated by dividing the price by the utility floor space.

Price zones

The municipalities are divided into three categories of price levels.

Time of measurement

The price is connected to the quarter in which the municipalities register the construction work as completed.

6.6. Sources of error and uncertainty

Measurement and processing errors

Respondents may misunderstand one or more of the questions on the form. The forms are read optically with automatic verification and transfer to electronic storage. Errors can occur during the optical scanning, particularly when reading figures consisting of many digits. Machine controls ensure, however, correspondence between partial costs and total costs, and that detached houses with very high or low square metre prices are not included in the calculation of the index. In 2006, our requirements are: useful floor space should be between 50 and 450 square metres and price per square metre should be between NOK 1 500 and NOK 20 000.

Non-response error

The resulting variations in the index estimates are called non-response errors. Response rate is almost 75 per cent. The standard deviation due to non-response is normally calculated at between 0.5 and 0.7 percentage points. Our quality tests indicate no essential difference between the final sample and the population, concerning the floor space and the location of the houses. (Jensen 1999)

Non-sampling errors

The quality of the Ground Property, Address and Building Register (GAB) is important. Municipalities can make mistakes when registering data. There are also municipalities that, for various reasons, do not always follow the current registration rules in GAB. It may also happen that buildings are incorrectly classified, i.e. that a detached house has been given another type of building classification in the register. These detached houses will then not be included in the calculations. It can also happen that other buildings are incorrectly classified as detached houses. If so, the respondent usually gives notice. Due to registration delays in GAB, not all detached houses registered as completed during the quarter in question are actually completed during this quarter. Average delay measured in 2005 was 1.2 months.

7. Price index for new multi-dwelling houses

7.1. Background and purpose

Statistics Norway started this project by obtaining price data from two different sources, the Ground Property, Address and Building Register (GAB) and a questionnaire distributed directly to the contractors. The cost data from the contractors should make it possible to compile output prices, but it turned out that the quality of the data varied. It is difficult for the contractors, who are also the client in many cases, to sort out the client costs and selling profits from contractor costs and contractor profits.

Cooperating with Norwegian State Housing Bank

When the opportunity to use administrative register data from the Norwegian State Housing Bank arose in 2004, Statistics Norway decided to change the data source. The use of administrative data also reduces the reporting and the record-keeping burden of the industry.

Most constructors in Norway apply for loans in the Norwegian State Housing Bank; the state loan fund for the support of private buildings. Final owners of the dwellings decide if they want to take advantage of this funding opportunity. When applying for a loan, constructors must provide the bank with detailed information about price, floor space and other characteristics of the project. This information forms the basis for the data we use in the index calculations. The consequence is that the price index compiled is a seller's price index exclusive of the cost of site, and not an ideal output price index.

Users and applications

The price index is used to analyse and monitor price/cost changes and is also used in the national accounts. Users are institutions and people with an interest in the housing market, including research and financial institutions and the media.

7.2. Population and publications

The population consists of dwelling houses except detached houses and residences for communities **i**n which building work commenced during the six-month reference period. The observation unit is projects for which the Norwegian State Housing Bank has granted loans.

Half-yearly publication

One index for small houses and one for blocks of flats are published at national level. Due to the relatively limited production of multi-dwelling houses, the number of observations is low. In order to ensure the quality of the index, we have decided to publish it twice a year, not quarterly as is the case with the index for detached houses.

7.3. Sources of data

The Norwegian State Housing Bank has two different sources of data in their administrative register. Data based on loan applications: costs estimated by the builder of a multi-dwelling house prior to the building of the house. These costs form the basis of the loan application. And secondly, data based on the final costs: the actual costs of the building, as accounted for by the builder. These costs form the basis of the disbursement of loans to each purchaser (final owner) of the dwellings.

An examination of the data based on the final costs, shows that it is impossible to separate site costs from the total costs for a substantial amount of the projects (about 1/3 of the projects). In addition, some purchasers choose sources of funding other than the Housing Bank and are not included in the data.

Due to the large number of projects being lost in the data based on the final costs, Statistics Norway has decided to calculate the index using the data based on loan

applications. A thorough examination of the two different sets of data shows no systematic deviations between them.

Data based on loan applications

When the Housing Bank grants a loan to a multi-dwelling project, this implies that the final owners may fund the dwellings with the loan. Whether the final owner wants to take advantage of this possibility or use other ways of funding, is optional.

The builder applies for the loan and the application contains a detailed description of the costs, buildings and the dwellings of the project, in addition to information about the applicant (contractor, client, housing cooperation or private individual) and the location of the project (municipality). Applications are, in most cases, dispatched before building commences.

The data are organised in four levels and one project may consist of many records. We have aggregated the information in such a way that each project consists of only one record, containing all information about the buildings in the project.

7.4. Compilation

Hedonic method

The price information received from the Norwegian State Housing Bank is linked to building projects and not to the individual dwellings. Therefore, the regression analysis has been developed with the project as the unit. The population is divided into two classes of multi-dwelling houses and we estimate separate regression equations for each class.

Log-linear price function

We choose a log-linear function form in the regression analysis. The regression model is based on two sets of independent variables. Numeric variables such as floor space and number of dwellings, and classification variables such as price regions. The classification variables have the value 1 or 0 according to whether they are part of the class or not.

The hedonic function form can be written as follows:

$$\ln P_t^j = a + b^1 x_t^{1j} + b^2 x_t^{2j} + ... + b^{lj} x_t^{lj} + \varepsilon_t^j \qquad (7.1)$$

Where P_t^j is the average dwelling price for project *j* in period *t*, and x_t^j are the independent variables for project *j* in period *t*. The regression coefficients and $b^1 \ldots . b^l$ can be expressed as the theoretical price to the explanatory variables. The coefficient *a,* is the baseline value per project irrespective of changes in the characteristics. The residual ε_t^i is a stochastic variable with an expected value of zero.

The following independent variables are used in the regression analysis:

Numeric variables:

- The natural logarithm of average floor space in the project
- The natural logarithm of the number of dwellings in the project
- The proportion of dwellings with energy economising qualities in the project

Classification variables:

- Price zones
- Years of price measurements

The numeric independent variables, floor space and number of dwellings are transformed into a logarithmic scale in the regression model. The number of observations per year is low. Observations from a period of five years are therefore used in the regression analysis to obtain stable estimates of the hedonic price function. The price coefficients are assumed to be constant for that period of time. In order to achieve the best possible estimate for the coefficients, the regression equations contain year classification variables. This prevents price changes due to the

passing of time being explained by attributes of the house. The coefficients for the time variables are not used in the calculation of the index.

Alternatively, the function can be written as follows:

(7.2) $$P_t^j = \exp(a)(y_t^{1j})^{b^1}(y_t^{2j})^{b^2}\ \exp(b^{3j}x_t^{3j})....\exp(b^{lj}x_t^{lj})\exp(\varepsilon_t^j)$$

Where y^1 is average floor space and y^2 is number of dwellings.

Index formula

We want to calculate the average price with the dwelling as the unit. The equation takes the form:

(7.3) $$\overline{\ln P_t} = a + b^1\sum_{j=1}^{m_t} w_t^j x_t^{1j} + ... + b^k\sum_{j=1}^{m_t} w_t^j x_t^{kj}$$

where m_t is the number of projects in period *t,* and the weight

$w_t^j = \dfrac{n_t^j}{\sum_{j=1}^{m_t} n_t^j}$ is the number of dwellings in project *j,* (n_t^j) divided by the total number of dwellings in period *t.*

We choose the following adjusted Jevons index:

$$I_{0,t} = \frac{\overline{P_t}}{\overline{P_0}}\,adj(\overline{x_0}, \overline{x_t})$$

where

$$\overline{P_t} = \left(\prod_{j=1}^{m_t}\left(P_t^j\right)^{n_t^j}\right)^{\frac{1}{\sum_{j=1}^{m_t} n_t^j}} = \prod_{j=1}^{m_t}\left(P_t^j\right)^{W_t^j} = \exp(\overline{\ln P_t})$$

The average price is then calculated as a weighted geometrical average adjusted for the weighted average values of the characteristics in the period *t* and in base period 0 as expressed in (7.1). The adjusting component can then be written as follows: $adj(\overline{x_0}, \overline{x_t})^{-1} = \dfrac{\exp\left(b^1\sum_{j=1}^{m_t} w_t^j x_t^{1j} + ... + b^k\sum_{j=1}^{m_t} w_t^j x_t^{kj}\right)}{\exp\left(b^1\sum_{j=1}^{m_0} w_0^j x_0^{1j} + ... + b^k\sum_{j=1}^{m_0} w_0^j x_0^{kj}\right)}$

Such that the index formula is explicitly given by:

(7.4) $$I_{0,t} = \frac{\exp\left(\overline{\ln P_t} - b^1\sum_{j=1}^{m_t} w_t^j x_t^{1j} - ..... - b^k\sum_{j=1}^{m_t} w_t^j x_t^{kj}\right)}{\exp\left(\overline{\ln P_0} - b^1\sum_{j=1}^{m_0} w_0^j x_0^{1j} - ..... - b^k\sum_{j=1}^{m_0} w_0^j x_0^{kj}\right)}$$

where

$$\overline{\ln P_t} = \ln\left(\prod_{j=1}^{m}\left(P_t^j\right)^{w_t^j}\right) = \ln\left(\left(P_t^1\right)^{w_t^1}\right) + ... + \ln\left(\left(P_t^m\right)^{w_t^m}\right)$$

Annual chained index

The price coefficients are revised yearly and the indices for small houses and blocks of flats are calculated as chained indices with annual links. The shift of the base period takes place in the second half of the year with the previous year as the new base period. Chained indices for the period: 2,*t* = second half of year t and period 1,t+1= first half of the next year, can be written as follows:

$$(7.5) \qquad I_{2,t}^{chained} = I_{2,t}^{newb} \frac{I_{1,t}^{oldb}}{I_{1,t}^{newb}} \qquad \text{and} \qquad I_{1,t+1}^{chained} = I_{1,t+1}^{newb} \frac{I_{1,t}^{oldb}}{I_{1,t}^{newb}}$$

Weights

The indices for the two housing classes are weighted into a total index for multi-dwelling houses. The weights are the proportion of dwellings started per housing class during the last three years, taken from Statistics Norway's building statistics ("building work started"). The weights are shifted yearly in the second half of the year. The total index takes the form:

$$(7.6) \qquad I_{0,t}^{total} = I_{0,t-1}^{total}(w_0) I_{t,t-1}^{total}(w_{t-1})$$

where

$$I_{t,t-1}^{total}(w_{t-1}) = I_{t,t-1}^{small} w_{t-1}^{small} + I_{t,t-1}^{block} w_{t-1}^{block}$$

and

$$w^{small} + w^{block} = 1$$

7.5. Concepts, variables and classifications

The following is an overview of important terms, variables and classifications used in the index.

Price

The price used in the index is the price that the purchaser (final owner) has to pay for a dwelling in a new multi-dwelling house, excluding site costs. Costs such as connection to road, water and sewer services, duties and administrative fees, interest on building loans, client profits and VAT are included. Thus, the price is the approximate sales price, excluding site costs. Prices are based on loan applications and are estimates of final costs, not the actual final costs.

Time of measurement

The index is comprised of multi-dwelling housing projects for which the Norwegian State Housing Bank has granted loans during the six-month reference period. Loans are normally granted before or when the building commences. As a rule, 50 per cent of the dwellings will be sold before building commences.

House classes

We distinguish between two different types of multi-dwelling houses.

- Small houses: Semi-detached houses, row houses, terraced houses and other small houses
- Blocks of flats: Flat blocks and apartment houses with three or more stories

Total floor space

The floor space used in the index is the utility floor space per dwelling in the building. The floor space of communal areas is included. Communal areas include corridors, garages etc. The utility floor space is the area measured within the outer walls, defined in Norwegian Standard NS 3940 Area and volume calculations of buildings.

Price zones

Price trends vary from one region of Norway to another. In order to allow this, Norway is divided into three different price markets or zones:

- Oslo and the municipality of Bærum
- The major cities of Stavanger, Bergen and Trondheim, and the county of Akershus excluding Bærum
- The rest of the country

Energy economising qualities

Buildings classified as having "energy economising qualities" have to meet the goal of more than 20 per cent lower energy consumption than currently set by the building regulations.

The overall goal of the government is that 50 per cent of the dwellings built in 2010 shall have a 50 per cent lower energy consumption than regulated today. Different building works to achieve lower energy consumption are included in this variable, such as insulation, balanced ventilation and thermal pump.

7.6. Sources of error and uncertainty

Measurement and processing errors

Errors can occur during the data registering and processing carried out by the Norwegian State Housing Bank. Machine controls ensure, however, that projects with very high or low square metre prices are excluded in the calculation of index.

Sampling errors

Housing projects funded by the Norwegian State Housing Bank must meet certain criteria with regard to costs, construction and characteristics. These conditions are, to some extent, the result of political decisions and are subject to changes. This may lead to sample skewness, as the buildings included in the index are not necessarily representative for all new multi-dwelling houses.

8. House price index

8.1. Background and purpose

Purpose and history

The interest in monitoring house prices was created in the course of the 1980s by increasing prices and by the opening up of the credit market. The subsequent debt crisis and fall in house prices led to an increasing interest in the development of house prices and prices of other properties.

Statistics Norway began compiling the house price index in 1991. The index also includes new dwellings sold on the free market. The index is aimed at users with an interest in the housing market, including private persons, research institutions and the media. The house price index measures the development of the value of the total housing stock in Norway.

8.2. Publications

Quarterly indices

The house price index is published quarterly and is broken down into three types of residential buildings. Norway is divided into four price zones. Furthermore, separate indices are published for freeholder and cooperative dwellings. About 14 per cent of the dwelling stock in Norway is made up of cooperative dwellings. The house price index is published about 3-4 weeks after the end of the relevant quarter.

Prices per square metre

Based on the same data sources, average prices per square metre for freeholder dwellings are published quarterly. Average square metre prices are also published quarterly for the counties and yearly for the municipalities.

8.3. Sources of data

Data from real estate agencies

The population is all dwellings sold on the open market during the relevant quarter. Statistics Norway receives data from the website FINN.no, through cooperation with the Norwegian Association of Real Estate Agents (NEF) and the Association of Real Estate Undertakings (EFF). FINN.no cooperates with most important real estate agencies in Norway. From the second quarter of 2005, the house price index also includes data from Notar AS. From this point, all main real estate brokers are included in the survey. The data obtained from FINN.no and Notar includes mostly freeholder dwellings and gives information about single dwelling sales, such as price, floor space and location. FINN.no and Notar AS report their sales monthly.

Data from cooperative housing

The Norwegian Federation of Cooperative Housing Associations (NBBL) provides data for cooperative housing. Most of NBBL's members report their sales quarterly to NBBL. All major members report their sales and at the moment 35 housing cooperatives are included in NBBL's database. These 35 associations administer about 77 per cent of the cooperative housing stock in Norway. The data obtained from NBBL about the housing cooperative sales includes both single dwelling information and average figures of different categories (sizes and types) of dwellings. NBBL report their sales quarterly.

8.4. Compilation of index for freeholder dwellings

Compiled with the hedonic method

The indices for freeholder dwellings are calculated by using a simple hedonic model with floor space and location as explanatory variables. The relatively high number of dwelling sales makes up for the lack of other dwelling quality data. Previous regression analysis, including a lot of quality variables, shows that the living area is the most significant factor influencing the price of a house, followed by the year of construction and the location of the house.

Log-linear price function

We have chosen a log-linear function form with the natural logarithm of sales price as a dependent variable. Useful floor space is the only numeric explanatory variable in

the regression model. Classification variables used in the regression analysis are price zone variables and cross-variables between price zones and floor spaces. By using these cross-variables we are adjusting for the variations in the price elasticity between zones.

In order to achieve the best possible estimate for the coefficients, the regression equations also contain quarterly classification variables. This prevents price changes due to the passing of time being explained by attributes of the house. The coefficients for the time variables are not used in calculating the index.

The equation takes the form:

$$\ln P = a + b \ln x + c^1 y^1 + ...c^n y^n + \varepsilon \tag{8.1}$$

Where P is house price, a is the estimated price irrespective of the value of the explanatory variables, x is the useful floor space, $y^1 - y^n$ are the classification variables and b and $c^1 - c^n$ are the price coefficients. The residual ε is a stochastic variable with an expected value of zero.

Regression analysis

One possibility is only to use a regression equation where the type of house and zone are dummy variables. By doing so, however, we are assuming that one of the coefficients in the equation is independent of both the type of house and the geographical zone. This is highly doubtful. For instance, it is not unreasonable to assume that one would have to pay more for an extra square metre in a block apartment than in a detached house. Furthermore, perhaps an extra square metre adds more to the price in the cities than elsewhere in the country. One solution to this problem is to estimate 12 regression equations, one for each price index we intend to make. This would give tailor-made equations for each type of house in each price market. The disadvantage here is that the estimates increase in uncertainty because of the small number of observations.

Our choice falls therefore on a halfway solution. We estimate three regression equations, one for each type of house. The question of different prices in different zones is solved by making the geographical region a classification variable. If the coefficients of a variable differ greatly from zone to zone, we solve this by using cross-variables in the equation.

Index formula

The equation (8.1) can alternatively be written as follows

$$P = \exp(a)(x)^b \exp(c^1 y^1) \ldots \exp(c^n y^n) \tag{8.2}$$

The price index is defined as the relation between the price of two houses equal in quality in the quarter t and the base year 0 respectively. If both houses have a vector of quality attributes equal to $(x, y_1, \ldots, y_l)$ the price index can be written as (Lillegård, 1994)

$$I_{0,t} = \frac{\exp(a_t)(x_t)^{b_t} \exp(c_t^1 y_t^1) \ldots \exp(c_t^n y_t^n)}{\exp(a_t)(x_t)^{b_0} \exp(c_0^1 y_t^1) \ldots \exp(c_0^n y_t^n)} \tag{8.3}$$

In the index formula, the error terms are omitted. This means that we cannot see the relation between anticipated prices. On the other hand, the index shows the relation between the price medians for any given quality vector. Medians for the type of functions discussed here are always smaller than or equal to the anticipated value. If, however, the price variation is the same for both the quarter and the base year, which is not an unreasonable supposition, the relation between the medians will be equal to the relation between the anticipated prices (Goldberger 1968).

If we assume that the price coefficients are constant for a short period of time (8.3) we can reduce the price index to a simplified form.

$$I_{0,t} = \frac{\exp(a_t)}{\exp(a_0)} \tag{8.4}$$

Constants are easy to estimate in linear regression. If we take the mean value on both sides of the equal sign in equation (8.1) and then transpose, the constants can be written as follows.

$$a = \overline{\ln P} - b \ln \bar{x} - \sum_{i=1}^{n} c^i \overline{y^i} \tag{8.5}$$

Then the constants are calculated in both the period *t* and the base year, and we obtain the following equation for the price index.

$$I_{0,t} = \frac{\exp\left(\overline{\ln P_t} - b \ln \overline{x_t} - \sum_{i=1}^{n} c^i \overline{y_t^i} \right)}{\exp\left(\overline{\ln P_0} - b \ln \overline{x_0} - \sum_{i=1}^{n} c^i \overline{y_0^i} \right)} \tag{8.6}$$

Where

$\overline{\ln P_0}$, $\overline{\ln P_t}$ are the mean values of the natural logarithm of the house price in basis and in period *t*.

b is the price coefficient for the natural logarithm of the useful floor space.

c^i is the price coefficient for the classification variables *i*.

$\overline{x_0}, \overline{y_0^i}\ \overline{x_t}, \overline{y_t^i}$ are the mean values of useful floor space and the classification variables *i* in basis and in period *t* respectively.

Annual chained index

Sub-indices for the 12 combinations of house type and price zone are calculated. The price indices for freeholder dwellings are calculated as a chained index with annual links. The shift of the basis takes place in the second quarter of the year with the previous year as the new basis. Observations from both the base year and the year before are used in the regression analysis to obtain more confident and stable estimates of the price coefficients. The price coefficients are assumed to be constant for that period of time. The chained index for the second quarter of 2005 takes the form as in formula (6.4).

Weights

The sub-indices for the housing classes are weighted into a total index for every price zone and the country as a whole. The weights are the estimated total value of housing stock within each combination of house type and price zone. The weights are shifted yearly in the second quarter of the year. A weighted total index takes the form:

$$I_{0,t}^{total} = I_{0,t-1}^{total}(w_0) I_{t,t-1}^{total}(w_{t-1}) \tag{8.7}$$

where

$$I_{t,t-1}^{total}(w_{t-1}) = \sum_{i=1}^{n} I_{t,t-1}^{i} w_{t-1}^{i}$$

$\sum_{j=1}^{n} w^i = 1$ and *n* is the number of sub-indices.

8.5. Compilation of index for housing cooperatives

Compilation based on average prices

Part of the figures received from NBBL is average prices for five room categories[1]: one-, two-, three-, four- and five-room dwellings. Therefore, the price indices for housing cooperative dwellings are calculated as Laspeyres price indices with 1998 as the price and weight base period. The proportions of sales numbers of each room category in each housing cooperative are used as weights in the calculation of average prices.

Average prices are calculated for each housing cooperative, for one-, two-, three-, four- and five-room dwellings in small houses and blocks of flats respectively. For each price zone, a weighted average price is calculated for dwellings in small houses and blocks of flats respectively, with the formula as follows.

(8.8) $$\overline{P_t} = \frac{1}{n_0}\sum_{i=1}^{m}\sum_{j=1}^{5} n_0^{i,j}\,\overline{P_t^{i,j}}$$

where

m is the number of housing cooperatives in the price zone.

$n_0^{i,j}$ is the number of sales of room category j in housing cooperative i in base period.

n_0 is the total number of sales in the price zone in base period.

$\overline{P_t^{i,j}} = \frac{1}{n_t^{i,j}}\sum_{o=1}^{n_t^{i,j}} P_t^o$ is the average price of room category j in housing cooperative i. Where $n_t^{i,j}$ is the number of sales of room category j in housing cooperative i in period t.

Laspeyres index formula

The price index for each house type in a price zone can be written as follows.

(8.9) $$I_{0,t} = \frac{\overline{P_t}}{\overline{P_0}} = \frac{\frac{1}{n_0}\sum_{i=1}^{m}\sum_{j=1}^{5} n_0^{i,j}\,\overline{P_t^{i,j}}}{\frac{1}{n_0}\sum_{i=1}^{m}\sum_{j=1}^{5} n_0^{i,j}\,\overline{P_0^{i,j}}} = \sum_{i=1}^{m}\sum_{j=1}^{5}\frac{n_0^{i,j}\,\overline{P_0^{i,j}}}{\sum_{k=1}^{m}\sum_{l=1}^{5} n_0^{k,l}\,\overline{P_0^{k,l}}}\frac{\overline{P_t^{i,j}}}{\overline{P_0^{i,j}}}$$

$$= \sum_{i=1}^{m}\sum_{j=1}^{5} w_0^{i,j} I_{0,t}^{i,j}$$

where

$I_{0,t}^{i,j} = \frac{\overline{P_t^{i,j}}}{\overline{P_0^{i,j}}}$ is the price index for room-category j in housing cooperative i.

$w_0^{i,j} = \frac{n_0^{i,j}\,\overline{P_0^{i,j}}}{\sum_{k=1}^{m}\sum_{l=1}^{5} n_0^{k,l}\,\overline{P_0^{k,l}}}$ is the share of value for room category j in housing cooperative i in basis.

$$\sum_{i=1}^{m}\sum_{j=1}^{5} w_0^{i,j} = 1$$

[1] This relates to five of the housing cooperatives: OBOS, Drammen, Stavanger, Ålesund and Tromsø. We receive individual observations from the remaining 31 housing cooperatives in NBBL's data basis.

Total price indices

Total dwelling price indices for each price zone and for the whole country, for freeholder and cooperative houses separate and together, are compiled by using the estimated total value of housing stock within each combination of house type and price zone as a weight. The formula takes the form (8.7).

Seasonal adjustments

The five main indices (for the country as a whole and for each of the four price zones) are adjusted for seasonal variations. Analyses show a stable variation over the year, with a peak in the second quarter. X12-ARIMA is used for this purpose. (Quang 2004)

8.6. Concepts, variables and classifications

Ownership

The dwelling stock is divided into two categories of ownership:

- Freeholder
- Cooperative housing

House types

The houses are divided into three categories:

- Detached houses
- Small houses: semi-detached houses, row houses, terraced houses and other small houses
- Blocks of flats: Flat blocks and apartment houses with two ore more stories.

Price zones

The country is divided into four price zones:

- Oslo and the municipality Bærum in the county Akershus
- The rest of Akershus county
- The cities of Stavanger, Bergen and Trondheim
- The rest of the country

Price

The price is the registered purchase price of the dwelling. For cooperative dwellings, both deposit and joint debt are included in the price.

Useful floor space

Useful floor space is the floor area measured within the outer walls, excluding cellars, garage, non-habitable attics and, in multi-dwelling houses, common spaces.

Price per square metre

Price per square metre is calculated by dividing the price by the useful floor space.

8.7. Sources of error and uncertainty

Measurement and processing errors

Errors can occur during the data registering and processing carried out by the data suppliers (FINN.no, Notar AS and NBBL). Machine controls ensure, however, that dwellings with particularly small or large useful floor spaces or very high or low square metre prices are not included in the calculation of the index.

Sampling errors

The sample covers the majority of all sales of dwellings on the open market. Systematic skewness is still possible in the sample with regard to house type and geography.

The index tends to overestimate the price increase

The hedonic model used in the compilation of the house price index includes only a few explanatory variables and does not adjust for housing standard and for the age of the building, only for dwelling size and location. The index is therefore expected to overestimate the price increase.

8.8. Breach in time series

Change in data sources

Until 2002, Statistics Norway collected data directly from the purchasers in a quarterly survey. Information from the survey was combined with information collected from the Ground, Property, Address and Building Register (GAB). The compilation method was the same but the number of explanatory variables in the regression model was more comprehensive.

Change in weight concept

The concept of weights has been changed twice since Statistics Norway started compiling the house price index in 1991. From 1991 to 1997, the total number of sales in each category was used as a weight. From 1997 to 2002, each category's share of the total housing stock was used as a weight. Finally, from 2002, each category's share of the value of the housing stock is used as a weight.

The change in 1997, means that price zones with relatively few sales are given a stronger weight.

The change in 2002, means that price zones with a higher price level are given a stronger weight.

Change in floor space concept

Until 2002, utility floor space was used as a concept of floor space. After changing data sources it was necessary to change the concept of floor space to useful floor space. Square metre prices are therefore not comparable before and after the first quarter of 2002.

9. Price index for office and business properties

9.1. Background, purpose and publications

Initiative of The Financial Supervisory Authority

The index has been published since 1996 after an initiative by The Financial Supervisory Authority of Norway. The purpose of the statistic is to measures the development of the value of the total stock of office and business buildings in Norway.

The development in property prices may have a direct effect on the financial strength of financial institutions and the stability in the financial market. The development in prices of office and business buildings is also an important indicator of business prospects.

Half-yearly publication

Because of the small number of transactions, the index figures are only published half-yearly and at national level.

9.2. Sources of data

Population

The survey includes all transfers of office and business properties in the free market, registered in the governmental administrative register of deeds and the Ground Property, Address and Building Register (GAB). Transfers of properties in connection with ownership changes in limited companies are not included. The statistical unit may be a building, a part of a building or multiple buildings.

Quarterly survey

The data are obtained from two sources: the Ground Property, Address and Building Register (GAB) and a quarterly survey. The GAB register provides information on the price and location of the properties as well as purchaser information. Supplementary information on the transaction and information on the standard of the building and the floor space used for different purposes are collected from questionnaires. The questionnaires are sent out five to six weeks after the end of the quarter. The response deadline is set to three weeks after distribution.

9.3. Compilation

Hedonic method

The Price index for office and business properties is calculated using the hedonic method with a log-linear function form. The regression model is the same as the model used in compiling the house price index. The numbers of explanatory variables are higher. The natural logarithm of the property price is the dependent variable.

Log-linear price function

The equation takes the form

$$\ln P = a + b^1 \ln x^1 + ... + b^k \ln x^k + c^1 y^1 + ...c^l y^l + \varepsilon \tag{9.1}$$

Where P is the property price, a is the estimated price irrespective of the value of the explanatory variables, $x^1 - x^n$ is the numeric variables, $y^1 - y^n$ are the classification variables and $b^1 - b^n$ and $c^1 - c^n$ are the price coefficients. The residual ε is a stochastic variable with an expected value of zero.

The country is divided into three price zones. Analyses show a variation in price elasticity between the zones. Therefore, the price coefficients are calculated separately for the three zones.

Numeric variables

The regression models include the following explanatory variables:

- The natural logarithm of the gross area
- The share of office, shop, and other business area
- The share of storage, garage and production area

Classification variables

- Lift
- The transaction include rent
- Type of ventilation
- Is the building built before or after 1987
- The property include one building, more than one building or only a part of a building (section)

Price regions in Oslo and Bærum

In the regression models for the price zone Oslo and Bærum, Oslo and Bærum is in addition divided into three price regions.

Half-yearly variables

In order to achieve the best possible estimate for the coefficients, the regression equations also contain half-yearly classification variables.

Index formula

First an index for each of the three price zones is calculated with following index formula, which is the same formula used to calculate the house price index (Chapter 8.4):

(9.2)
$$I_{0,t} = \frac{\exp\left(\overline{\ln P_t} - \sum_{i=1}^{k} b^i \overline{x_t^i} - \sum_{i=1}^{l} c^i \overline{y_t^i}\right)}{\exp\left(\overline{\ln P_0} - \sum_{i=1}^{k} b^i \overline{x_0^i} - \sum_{i=1}^{l} c^i \overline{y_0^i}\right)}$$

where

$\overline{\ln P_0}$, $\overline{\ln P_t}$ are the mean values of the natural logarithm of the house price in basis and in period *t.*

b^i, c^i are the price coefficients for the numeric and the classification variables respectively.

$\overline{x_0^i}, \overline{y_0^i}$ $\overline{x_t^i}, \overline{y_t^i}$ are the mean values of the numeric variables and the classification variables *i* in basis and in period *t*, respectively.

Annual chained index

The price zone indices are calculated as a chained index with annual links. The shift of the basis takes place in the second half of the year with the previous year as the new basis. Observations from both the five last years are used in the regression analysis to obtain more confident and stable estimates of the price coefficients. The coefficients are assumed to be constant for that period of time. Chained index formula is the same as (7.2).

Weights

The zone indices are weighted into the total index. The weights represent the estimated total value of the stock of office and business properties within each price zone. The weights are shifted yearly in the second quarter of the year. A weighted total index takes the form:

(9.3)
$$I_{0,t}^{total} = I_{0,t-1}^{total}(w_0) I_{t,t-1}^{total}(w_{t-1})$$

where

$I_{t,t-1}^{total}(w_{t-1}) = \sum_{i=1}^{n} I_{t,t-1}^{i} w_{t-1}^{i}$ $\sum_{j=1}^{3} w^i = 1$ and 3 is the number of zones.

These sub-indices are weighted and combined into an index for the country as a whole. The weights represent the estimated total value of the stock of office and business properties within each price zone. The weights are revised each year.

Non-seasonal adjustments

The index is not published in a seasonally adjusted form. Analyses show an unstable seasonal variation over the year. (Quang 2004)

9.4. Concepts, variables and classifications

Types of properties

Dwelling property, holiday property, agricultural/forestry/fishery property, commercial/office property, industrial property, communication purpose, other purpose and purpose not specified.

In these statistics, only commercial/office properties with buildings are used.

Price

The price is the registered purchase price of the property, including VAT.

Gross area

Gross area is floor area measured outside the outer walls, as defined in the Norwegian Standard NS 3940 Area and volume calculations of buildings.

Price zones

The country is divided into three price zones:

- Oslo and Bærum,
- The cities Stavanger, Bergen, Trondheim and Tromsø
- The rest of the country.

9.5. Sources of error and uncertainty

Measurement and processing errors

There is always a risk that respondents misunderstand one or more questions in the questionnaire. The questionnaires are read optically with automatic verification and transferred to an electronic storage medium. Errors can occur during the optical scanning, particularly when processing figures consisting of several digits.

Mathematical and logical checks are integrated parts of the registration procedure. Prices per square metre are checked and in cases of uncertainty the respondent is contacted by telephone. In addition, the following requirements apply:

- No more than one year between contract year and registered transfer year
- Sites without buildings are not included
- Buildings purchased to be demolished are not included
- Floor space between 50 and 20 000 square metres
- Price per square metre between NOK 1 000 and NOK 45 000 (in 2006)

Sampling errors

Transfers of properties in connection with ownership changes in limited companies are not included. It is therefore possible that there is systematic skewness in the sample.

Non-response is always an aspect of questionnaire surveys. The resulting variations in the index estimates are called non-response errors. The response rate at the deadline date is approximately 55 per cent. After reminders have been sent out, the response rate climbs to approximately 80 per cent.

Other errors

The time elapsing between the contract date and registration date can be long. If it exceeds one year, the sale is not included in the index. Furthermore, properties sold in the first half of the year may be included in the statistics for the second half of the year.

Buildings may also be incorrectly classified, i.e. an office or business building may be given an incorrect building classification in the register. Revision of the data has sometimes shown that some manufacturing and warehouse buildings have been incorrectly classified as office and business buildings.

10. Comparability and coherence

In chapter 2, the comparability between our input, output and seller's price indices is described. In this chapter we look at essential differences in the compilations of the price indices for new houses, the house price index, the transfer of real property statistics and the house price statistics compiled by the Norwegian Association of Real Estate Agents (NEF).

Different data sources influence the price definition and the point in time to which the prices are related. Methods of weighting and type of index formula are also of great importance when comparing price statistics.

Different cost elements

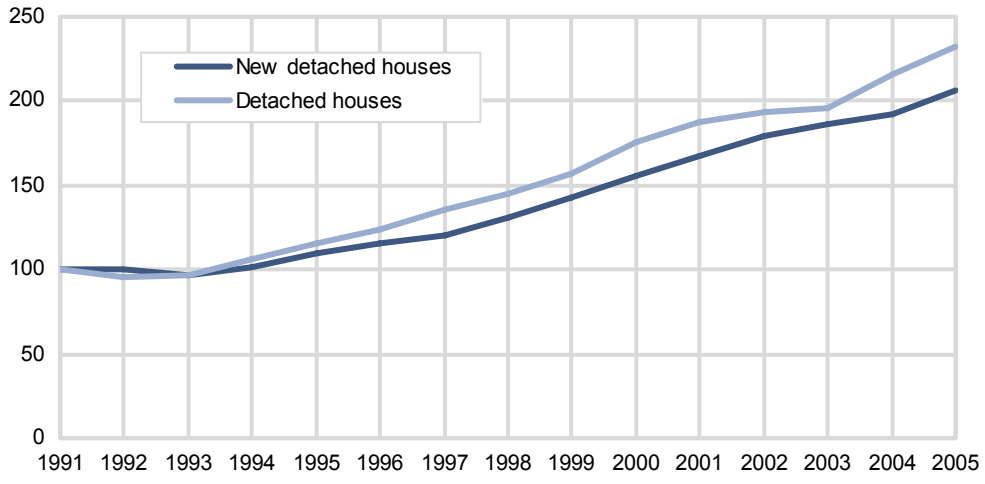
The price index for new multi-dwelling houses includes more cost elements than the price index for new detached houses, such as architect's and engineer's fees, interest on building loans and client's profit margins. (Chapter 2 and Figure 4.6) Both indices are exclusive of the cost of land and inclusive of VAT.

Different time of measurement

The time of measurement is different between these indices. The prices used in the index for new detached houses are connected to the quarter in which the municipalities register the construction work as completed. The prices used in the index for new multi-dwelling houses are connected to the half year period in which the Norwegian State Housing Bank has granted loans to the clients. Loans are normally granted before or when the building work commences. And the prices are market prices stipulated by the clients. The house price indices reflect the market prices at the correct period of time.

Therefore, the price index for new detached houses measures changes in the market with some delay compared with the house price index for detached houses. (Figure 10.1) Another important difference is that the compilation of the index for new detached houses is based on more data about the quality of the houses and tends, to a lesser degree, to overestimate the price increase.

Figure 10.1. House price index, detached houses. Price index for new detached houses. 1991=100



The price index for new multi-dwelling houses is more comparable with the house price indices than the price index for new detached houses. This is due to the fact that the time of measurements and number of quality variables in the regression models are more similar. Figures 10.2 and 10.3 show the price increase for new multi-dwelling houses and second-hand multi-dwelling houses since 2000. The prices of new flats in blocks increased more than flats in the second-hand market,

while the price increases for dwellings in new and older small houses are more equal.

Figure 10.2. Blocks of flats. House price index. Price index for new multi-dwelling houses. 2000=100

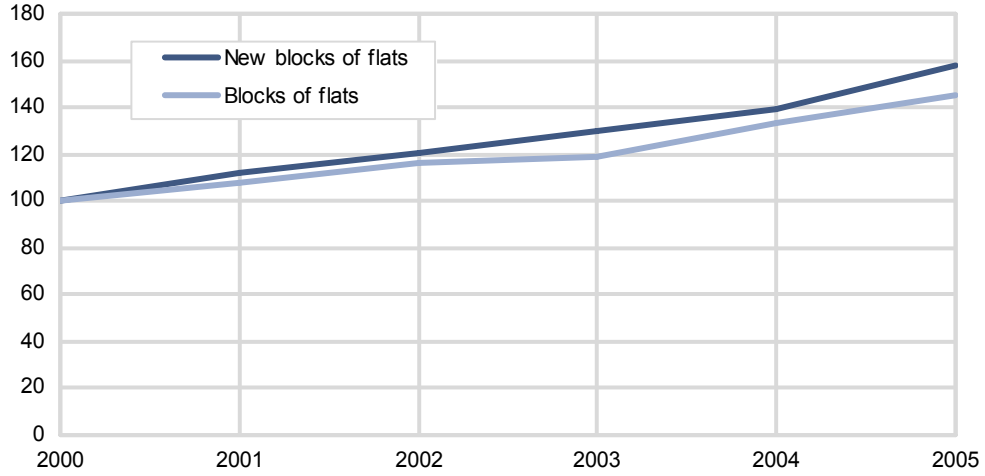
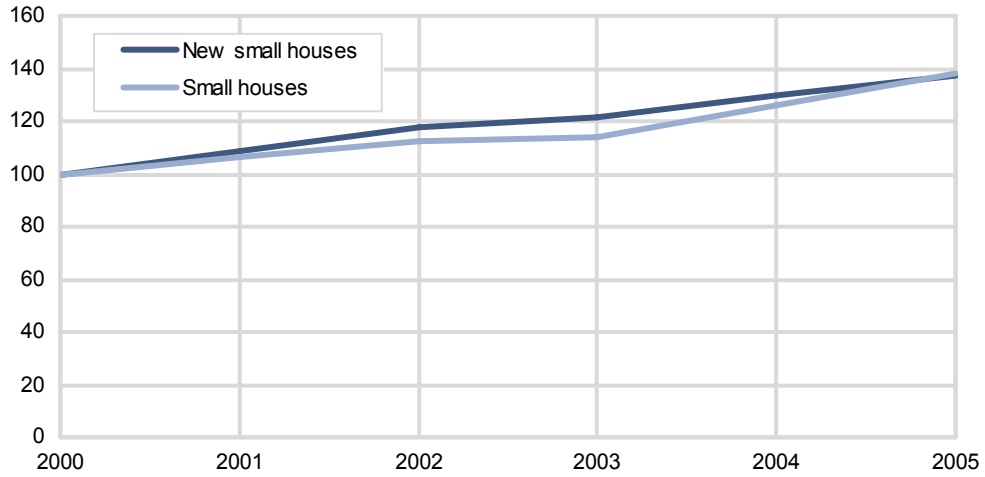


Figure 10.3. Small houses. House price index. Price index for new multi-dwelling houses. 2000=100



Three house price statistics

The Norwegian Association of Real Estate Agents (NEF) produces house price statistics, which monitor the national and regional prices on a monthly basis. In Figure 10.4, the development of house prices based on Statistics Norway's house price index, Statistics Norway's transfer of real property statistics and the house price statistics compiled by NEF are compared. The differences in the price increases are mainly caused by different populations and different methods of weighting.

The transfer of real property statistics are compiled as a simple average of purchaser prices in the quarter. Cooperative dwellings are not included. No corrections are made for differences in building characteristics, qualitative or quantitative. Yet the development does not differ much from the two other statistics because of the large number of observations, including the whole population of freeholder sales.

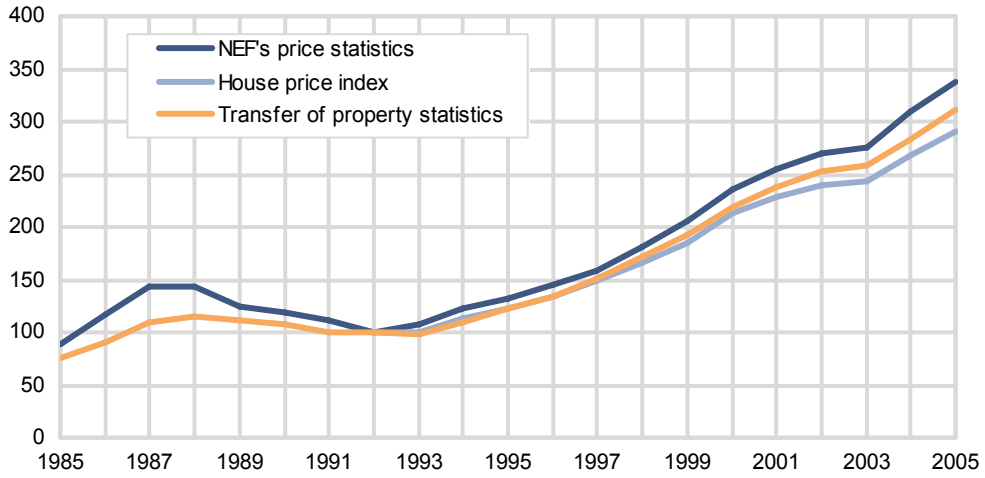
Different methods of weighting

The increase in house prices is lower in the house price index compiled by Statistics Norway compared with the house price index compiled by NEF. The main reason is choice of weights. The price index compiled by NEF uses the number of dwelling sales in the strata (house types and regions) as weight. Statistics Norway has changed the weighting system twice. In 1997, the weights were changed from number of dwelling sales to the stock of dwellings in the strata. In 2002, the weights were changed to the value of the stock of dwellings.

Different populations

In Statistic Norway's house price index, the population includes all dwellings in Norway, both freeholder and cooperative dwellings. The data source used by NEF includes only a small part of the cooperative dwellings, which leads to a skewed figure with regard to the total sale of dwellings. The differences in the populations have an opposite effect on the two house price indices compared to the differences in the weights. This is due to the fact that the cooperative dwellings have increased more than freeholder dwellings in the last decade.

Figure 10.4. House price index. Statistics Norway's transfer of property statistics. NEF 's price statistics. 1992=100



Sources: SSB, NEF, EFF, Finn.no og ECON.

1. Construction cost index for residential buildings. 2000=100

	Total	Labour cost	Materials
1978	36.0	..	35.1
1979	37.0	..	36.3
1980	40.3	..	40.6
1981	44.1	..	45.0
1982	47.8	..	48.1
1983	50.7	..	51.0
1984	53.2	..	53.2
1985	55.7	..	55.9
1986	59.8	..	60.3
1987	66.6	..	65.8
1988	72.5	..	70.6
1989	75.6	..	73.6
1990	78.0	..	77.3
1991	80.5	..	79.6
1992	81.1	..	80.4
1993	81.5	..	81.0
1994	84.3	..	84.7
1995	88.4	..	89.8
1996	89.4	..	90.2
1997	91.1	..	92.5
1998	93.8	..	94.7
1999	96.3	..	96.6
2000	100.0	100.0	100.0
2001	104.8	105.6	104.5
2002	108.3	110.6	107.1
2003	111.6	115.5	109.4
2004	114.9	118.9	113.5
2005	118.8	122.6	117.9
2004			
January	113.1	118.1	110.7
February	113.3	118.2	110.9
March	113.7	118.2	111.7
April	114.2	118.2	112.6
May	114.5	118.8	112.7
June	114.9	118.8	113.5
July	115.3	118.8	114.3
August	115.5	119.0	114.5
September	115.7	119.0	114.8
October	115.8	119.0	115.0
November	116.0	119.0	115.3
December	117.0	121.1	115.6
2005			
January	117.3	121.1	116.3
February	117.6	121.6	116.6
March	118.1	121.6	117.4
April	118.2	121.6	117.6
May	118.6	122.1	117.9
June	118.6	122.1	117.9
July	118.8	122.1	118.1
August	119.1	122.8	118.2
September	119.2	122.8	118.3
October	119.5	122.8	118.6
November	120.5	125.5	118.6
December	120.5	125.5	118.7

2. Construction cost index for detached houses of wood. 2000=100

	Detached houses of wood		Stone, clay and cement work		Site preparation		Other work		Carpentering		Painting, paperhanging and floor coating		Plumbing		Electricial installation work	
	Total	Materials	Total	Materials	Total	Materials	Total	Materials	Total	Materials	Total	Materials	Total	Materials	Total	Materials
1978	36.3	35.6	38.6	37.7	..	..	35.7	35.2	38.0	38.3	39.6	40.6	28.5	25.8	21.9	17.5
1979	37.3	36.8	39.5	38.9	..	..	36.6	36.5	38.8	39.4	41.0	42.9	29.6	27.2	23.0	18.7
1980	40.7	41.2	42.4	43.1	..	..	40.2	40.9	42.9	44.3	44.4	47.8	32.0	29.8	25.2	21.1
1981	44.6	45.6	46.3	47.7	..	..	44.1	45.2	47.4	49.4	47.1	50.3	34.4	31.9	28.2	23.9
1982	48.3	48.6	50.2	51.7	..	..	47.7	48.0	51.1	52.1	50.6	53.6	36.8	34.0	32.4	28.0
1983	51.1	51.4	52.8	54.3	..	..	50.6	50.9	53.9	55.0	52.8	55.1	39.7	36.8	35.7	31.2
1984	53.6	53.7	55.5	56.7	..	..	53.0	53.1	56.3	57.2	55.9	58.5	42.0	38.9	37.6	32.7
1985	56.2	56.3	57.8	58.9	..	..	55.7	55.9	58.8	59.7	59.3	62.7	44.7	41.8	40.2	35.1
1986	60.3	60.7	61.4	63.0	..	..	60.0	60.3	63.0	64.1	64.1	68.7	48.6	45.7	45.1	39.7
1987	67.1	66.3	68.3	67.9	..	..	66.7	66.0	69.5	69.7	72.2	75.3	55.1	51.1	51.1	44.7
1988	72.8	71.0	74.6	72.7	..	..	72.3	70.8	74.4	73.9	80.0	80.7	62.8	57.5	56.6	49.7
1989	75.8	73.7	77.9	75.9	..	..	75.2	73.4	76.5	75.5	84.8	86.8	68.0	63.1	61.0	54.2
1990	78.4	77.4	79.9	79.3	..	..	77.9	77.2	79.4	79.2	86.4	90.1	71.1	66.9	63.6	57.4
1991	80.8	79.7	82.6	81.7	..	..	80.3	79.4	81.5	81.0	88.5	92.7	74.6	70.8	66.3	60.7
1992	81.4	80.5	83.3	83.4	..	..	80.8	79.9	81.6	81.2	89.1	93.2	75.9	72.4	68.1	62.7
1993	81.5	81.0	83.6	84.4	..	..	80.8	80.4	81.4	81.1	88.7	93.1	77.0	74.0	70.3	66.3
1994	84.5	84.8	85.0	85.5	..	..	84.3	84.7	85.8	86.6	88.8	92.1	78.5	75.8	72.1	68.5
1995	88.6	90.2	87.7	88.5	..	..	88.9	90.6	90.8	92.8	91.2	95.5	82.6	80.8	77.2	75.5
1996	89.5	90.5	89.8	90.8	..	..	89.3	90.4	90.5	91.7	92.5	96.5	84.4	82.7	80.8	80.0
1997	91.3	92.6	91.6	93.8	..	..	91.2	92.3	92.3	93.7	93.2	96.8	86.2	84.7	83.9	82.7
1998	93.9	94.8	94.3	95.8	..	..	93.7	94.4	94.7	95.6	95.1	97.1	89.7	88.4	88.1	86.7
1999	96.3	96.6	96.5	97.2	..	..	96.2	96.4	96.6	97.0	97.0	98.0	93.7	92.6	93.6	91.4
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2001	104.8	104.5	104.2	103.6	103.8	103.3	104.9	104.6	104.6	104.2	104.1	102.5	106.2	106.7	107.4	109.3
2002	108.2	106.9	107.9	106.6	107.2	106.3	108.1	106.9	107.5	106.0	107.2	104.3	110.5	110.9	113.3	116.4
2003	111.4	109.2	111.4	110.3	108.7	109.4	111.1	109.0	110.1	107.6	109.2	105.1	116.3	116.8	118.6	121.8
2004	114.6	112.9	116.3	117.8	111.9	113.0	114.1	112.2	112.4	109.8	112.1	108.5	122.2	124.3	125.3	132.2
2005	118.4	116.8	120.8	123.3	115.8	116.6	117.7	115.9	115.3	112.3	115.5	111.2	128.9	133.3	134.1	146.4
2004																
January	112.9	110.5	113.3	112.3	109.7	111.5	112.6	110.3	111.3	108.4	111.0	107.4	118.4	118.4	122.6	127.5
February	113.1	110.7	113.6	112.6	110.1	111.7	112.8	110.4	111.4	108.6	111.1	107.3	118.5	118.4	122.8	127.8
March	113.5	111.4	114.0	113.8	110.2	111.9	113.2	111.0	111.5	108.7	111.1	107.5	121.2	123.0	123.9	129.9
April	114.0	112.2	115.1	115.5	111.4	112.3	113.5	111.7	111.9	109.4	111.4	107.9	121.6	123.8	124.3	130.7
May	114.2	112.2	115.6	116.2	111.7	112.5	113.7	111.6	112.0	109.2	111.8	107.9	122.3	124.8	124.8	131.0
June	114.6	112.9	116.4	118.3	112.0	113.3	114.0	112.1	112.3	109.7	112.1	108.5	122.4	124.9	124.9	131.3
July	115.0	113.6	116.9	119.5	112.0	113.6	114.4	112.7	112.7	110.2	112.5	109.2	122.4	124.9	126.0	133.5
August	115.1	113.7	117.3	119.9	112.5	113.7	114.6	112.9	112.9	110.4	112.5	109.0	122.6	124.9	126.1	133.5
September	115.3	114.0	117.6	120.8	112.5	113.8	114.7	113.1	112.9	110.5	112.6	109.2	123.9	127.2	126.1	133.5
October	115.4	114.2	118.0	121.3	113.3	113.9	114.7	113.2	112.9	110.6	112.5	109.1	123.9	127.2	126.3	134.0
November	115.6	114.4	118.1	121.8	113.0	114.0	114.9	113.4	113.0	110.7	112.8	109.6	124.0	127.2	127.0	135.2
December	116.5	114.7	119.2	122.1	113.9	113.9	115.8	113.6	113.8	110.8	113.7	109.7	124.8	127.2	129.3	138.5
2005																
January	116.8	115.4	119.1	122.3	113.7	115.5	116.2	114.4	114.2	111.4	113.7	109.8	124.8	127.2	131.2	142.4
February	117.2	115.6	119.7	122.8	114.2	115.5	116.5	114.5	114.5	111.5	114.4	110.5	125.1	127.2	131.4	142.4
March	117.7	116.4	120.0	123.2	115.0	116.4	117.1	115.4	114.7	111.9	114.4	110.5	129.2	134.4	131.4	142.5
April	117.8	116.7	120.1	123.4	115.0	116.7	117.3	115.7	114.9	112.2	114.6	110.9	129.3	134.4	131.5	142.5
May	118.2	116.9	120.4	123.5	115.0	116.8	117.6	115.9	115.1	112.3	115.4	111.7	129.4	134.4	132.9	145.0
June	118.2	116.9	120.5	123.6	115.2	116.8	117.6	115.9	115.1	112.3	115.2	111.2	129.5	134.4	133.1	145.3
July	118.3	117.0	120.6	123.6	115.6	116.8	117.7	116.1	115.2	112.4	115.3	111.5	129.5	134.4	133.7	146.6
August	118.6	117.2	121.1	123.6	116.0	116.8	118.0	116.2	115.4	112.5	116.1	111.6	129.5	134.4	135.4	147.9
September	118.7	117.2	121.1	123.1	116.6	116.9	118.1	116.4	115.4	112.5	116.2	111.7	129.5	134.4	136.7	150.4
October	119.0	117.5	121.5	123.6	117.2	116.9	118.3	116.7	115.6	112.8	116.0	111.3	129.9	135.0	136.7	150.4
November	119.9	117.4	122.6	123.5	118.2	116.8	119.1	116.6	116.4	112.7	117.0	111.6	130.7	134.9	137.5	150.4
December	119.9	117.5	122.3	123.2	117.7	116.9	119.2	116.7	116.5	112.8	117.3	112.1	130.7	134.9	137.4	150.4

3. Construction cost index for multi-dwelling houses. 2000=100

	Multi-dwelling houses		Site preparation		Carpentering		Painting, paperhanging and floor coating		Plumbing		Electricial installation work	
	Total	Materials	Total	Materials	Total	Materials	Total	Materials	Total	Materials	Total	Materials
1978	35.4	33.9	..	..	37.4	37.7	37.9	37.7	27.4	24.4	22.3	17.6
1979	36.3	35.2	..	..	38.2	38.8	39.5	40.8	28.5	25.7	23.4	18.8
1980	39.3	39.1	..	..	41.7	43.4	42.9	46.2	30.8	28.2	25.7	21.2
1981	43.1	43.5	..	..	46.1	48.4	45.7	48.9	33.1	30.3	28.8	24.0
1982	47.0	47.2	..	..	50.1	51.5	49.6	52.9	35.7	32.4	33.1	28.0
1983	50.0	50.2	..	..	53.1	54.5	51.9	54.7	38.5	35.2	36.4	31.3
1984	52.3	52.2	..	..	55.5	56.7	54.9	57.8	40.8	37.4	38.4	32.8
1985	54.7	54.8	..	..	58.2	59.6	57.9	61.5	43.6	40.4	41.0	35.2
1986	58.7	59.3	..	..	62.1	63.7	62.5	67.4	47.7	44.6	46.1	39.8
1987	65.7	64.8	..	..	68.8	69.3	71.1	74.6	54.4	50.2	52.1	44.8
1988	72.2	69.8	..	..	73.8	73.3	79.3	80.3	62.6	57.2	57.8	49.8
1989	75.8	73.7	..	..	76.2	75.2	84.1	86.8	68.0	63.3	62.3	54.3
1990	77.9	77.3	..	..	79.1	79.1	85.5	90.3	71.2	67.3	64.9	57.5
1991	80.5	79.6	..	..	81.6	81.3	87.6	93.3	74.8	71.2	67.5	60.9
1992	81.4	80.9	..	..	81.9	81.8	88.1	93.4	76.1	72.8	69.3	62.9
1993	82.0	81.8	..	..	82.1	82.2	87.0	91.7	77.1	74.4	71.1	66.5
1994	84.2	84.1	..	..	85.6	86.9	87.3	90.6	78.7	76.2	72.9	68.7
1995	87.7	88.2	..	..	89.8	92.1	89.8	94.9	82.9	81.4	77.5	75.7
1996	89.3	89.4	..	..	90.1	91.6	91.2	95.8	84.7	83.3	80.9	80.2
1997	90.9	91.7	..	..	92.0	93.8	92.1	96.2	86.5	85.3	84.2	82.9
1998	93.8	94.3	..	..	94.6	96.0	94.5	96.8	90.0	89.0	88.4	86.9
1999	96.3	96.5	..	..	96.8	97.5	96.6	97.7	94.0	93.2	94.0	91.6
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2001	104.9	104.6	103.5	103.2	104.5	104.0	104.4	102.5	106.7	107.5	107.3	109.3
2002	108.7	107.8	106.5	105.0	107.5	105.8	107.8	104.4	110.9	111.5	113.1	116.6
2003	112.5	110.1	108.0	107.1	110.3	107.6	110.3	105.6	116.4	116.9	118.3	122.3
2004	116.3	116.2	111.0	112.6	112.7	109.9	113.3	109.7	123.6	126.5	124.4	132.4
2005	120.9	122.6	115.3	118.5	115.7	112.6	116.7	112.3	129.5	133.9	132.8	146.8
2004												
January	114.1	111.5	108.5	108.1	111.6	108.6	112.2	108.5	118.8	118.9	121.9	127.8
February	114.3	111.8	108.9	108.3	111.8	108.8	112.3	108.6	118.9	118.9	122.2	128.2
March	114.8	113.1	109.0	108.4	111.8	108.9	112.4	108.7	122.2	124.6	123.0	130.1
April	115.3	114.6	110.0	108.9	112.1	109.3	112.6	109.1	122.6	125.3	123.4	130.7
May	115.7	115.0	110.3	109.0	112.3	109.4	113.1	109.2	123.5	126.6	123.8	131.0
June	116.3	116.3	111.1	113.3	112.6	109.8	113.3	109.7	124.1	127.5	123.9	131.3
July	116.8	117.6	111.4	115.5	112.9	110.4	113.7	110.5	124.2	127.7	125.1	133.8
August	117.0	117.8	111.9	115.6	113.1	110.5	113.7	110.3	124.5	127.9	125.2	133.9
September	117.3	118.3	112.0	115.8	113.1	110.5	113.8	110.5	125.7	130.0	125.2	133.9
October	117.6	118.8	112.5	115.7	113.1	110.5	113.7	110.3	125.7	130.0	125.4	134.3
November	117.8	119.3	112.5	115.9	113.2	110.7	113.9	110.8	125.8	130.0	126.0	135.6
December	118.9	119.9	113.4	116.3	114.2	110.9	114.8	110.6	126.6	130.0	128.0	138.4
2005												
January	119.2	120.8	113.0	117.3	114.5	111.7	114.9	111.0	126.6	130.0	130.1	143.1
February	119.6	121.2	113.6	117.3	114.9	111.9	115.6	111.7	126.9	130.0	130.3	143.1
March	119.9	122.0	114.3	118.4	115.1	112.2	115.7	111.8	129.5	134.5	130.3	143.1
April	120.0	122.1	114.5	118.5	115.3	112.5	115.9	112.1	129.5	134.5	130.4	143.1
May	120.4	122.3	114.6	118.7	115.4	112.5	116.6	112.9	129.7	134.5	131.6	145.4
June	120.6	122.5	114.8	118.8	115.5	112.5	116.4	112.3	129.7	134.5	131.8	145.6
July	120.8	122.8	115.2	118.7	115.6	112.6	116.6	112.7	129.7	134.5	132.6	147.5
August	121.2	123.0	115.7	118.7	115.8	112.7	117.3	112.5	129.7	134.5	134.1	148.6
September	121.4	123.1	116.3	118.9	115.9	112.8	117.4	112.7	129.8	134.5	135.0	150.6
October	121.7	123.5	116.8	119.1	116.1	113.1	117.4	112.4	130.2	135.2	135.1	150.6
November	123.0	123.7	117.6	118.8	116.9	113.0	118.4	112.6	131.1	135.2	135.9	150.6
December	123.1	123.8	117.2	118.9	117.0	113.1	118.7	113.1	131.1	135.2	135.9	150.6

4. Construction cost index for plumbing work in office and commercial buildings. 2000=100

	Plumbing work				Sanitary installations				Heating installastions			
	Total	Administrative expenses	Labour cost	Materials	Total	Administrative expenses	Labour cost	Materials	Total	Administrative expenses	Labour cost	Materials
1999	93.7	96.0	94.7	92.6	93.8	96.0	94.7	93.0	93.6	96.0	94.7	92.1
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2001	107.2	104.9	106.0	108.6	107.4	104.9	106.0	108.6	107.0	104.9	106.0	108.4
2002	111.8	109.0	111.0	113.2	112.4	109.0	111.0	114.0	111.1	109.0	111.0	112.1
2003	117.6	113.9	117.9	118.8	118.2	113.9	117.9	119.6	116.9	113.9	117.9	117.7
2004	124.4	116.0	123.0	127.8	124.4	116.0	123.0	127.2	124.4	116.0	123.0	128.6
2005	129.6	119.2	127.0	134.2	129.1	119.2	127.0	132.6	130.3	119.2	127.0	136.7
2004												
January	120.3	115.3	122.2	121.1	120.6	115.3	122.2	121.4	119.9	115.3	122.2	120.6
February	120.3	115.5	122.3	121.1	120.6	115.5	122.3	121.4	120.0	115.5	122.3	120.6
March	122.8	115.5	122.3	125.6	123.2	115.5	122.3	125.8	122.4	115.5	122.3	125.4
April	123.5	115.6	122.3	126.6	123.7	115.6	122.3	126.4	123.2	115.6	122.3	126.9
May	124.0	115.8	122.8	127.3	124.3	115.8	122.8	127.2	123.7	115.8	122.8	127.5
June	124.8	115.9	122.8	128.7	125.0	115.9	122.8	128.4	124.6	115.9	122.8	129.1
July	125.1	115.9	122.8	129.3	125.0	115.9	122.8	128.4	125.3	115.9	122.8	130.7
August	125.7	116.1	123.2	130.0	125.1	116.1	123.2	128.4	126.3	116.1	123.2	132.3
September	126.2	116.1	123.2	130.9	126.1	116.1	123.2	129.7	126.5	116.1	123.2	132.6
October	126.2	116.2	123.2	130.9	126.1	116.2	123.2	129.7	126.5	116.2	123.2	132.6
November	126.3	116.3	123.2	130.9	126.1	116.3	123.2	129.7	126.6	116.3	123.2	132.6
December	127.1	117.8	125.8	130.9	126.9	117.8	125.8	129.7	127.6	117.8	125.8	132.6
2005												
January	127.2	117.7	125.8	131.1	126.8	117.7	125.8	129.7	127.8	117.7	125.8	133.1
February	127.5	118.1	126.5	131.1	127.1	118.1	126.5	129.7	128.1	118.1	126.5	133.1
March	130.1	118.1	126.5	135.7	129.2	118.1	126.5	133.2	131.2	118.1	126.5	139.3
April	130.2	118.3	126.5	135.7	129.3	118.3	126.5	133.2	131.3	118.3	126.5	139.3
May	130.4	118.7	126.8	135.7	129.4	118.7	126.8	133.2	131.5	118.7	126.8	139.3
June	130.4	119.0	126.8	135.7	129.4	119.0	126.8	133.2	131.5	119.0	126.8	139.3
July	130.4	119.1	126.8	135.7	129.4	119.1	126.8	133.2	131.5	119.1	126.8	139.3
August	130.4	119.1	126.8	135.7	129.4	119.1	126.8	133.2	131.6	119.1	126.8	139.3
September	130.4	119.2	126.8	135.7	129.4	119.2	126.8	133.2	131.6	119.2	126.8	139.3
October	128.9	119.6	126.8	132.9	129.4	119.6	126.8	133.0	128.4	119.6	126.8	132.9
November	129.8	121.7	128.8	132.9	130.2	121.7	128.8	133.0	129.4	121.7	128.8	132.9
December	129.8	121.7	128.8	132.9	130.2	121.7	128.8	133.0	129.4	121.7	128.8	132.9

5. Construction cost index for road constructions. 1st quarter 2004=100

	Road construction				Open air road		Concrete bridge		Rock tunnel	
	Total	Materials	Machinery	Labour cost	Total	Materials	Total	Materials	Total	Materials
1985	50.7	55.0	49.2	46.2	..	..	..	..	..	..
1986	54.9	58.7	53.3	51.4	..	..	..	..	..	..
1987	62.5	63.4	61.0	62.5	..	..	..	..	..	..
1988	66.2	68.4	63.9	65.9	..	..	..	..	..	..
1989	68.2	71.6	65.8	66.3	..	..	..	..	..	..
1990	72.2	75.4	70.0	70.2	..	..	..	..	..	..
1991	76.5	78.3	74.4	76.3	..	..	..	..	..	..
1992	76.0	79.7	73.2	73.0	..	..	..	..	..	..
1993	76.8	80.2	75.3	72.2	..	..	..	..	..	..
1994	78.1	81.1	77.6	72.8	..	..	..	..	..	..
1995	79.7	82.6	79.5	73.5	..	..	..	..	..	..
1996	81.1	84.0	81.1	74.4	..	..	..	..	..	..
1997	82.4	85.7	82.2	75.3	..	..	..	..	..	..
1998	84.1	88.3	82.5	77.9	..	..	..	..	..	..
1999	86.6	90.2	85.6	80.6	..	..	..	..	..	..
2000	90.8	92.8	91.7	84.4	..	..	..	..	..	..
2001	93.6	95.4	93.8	89.2	..	..	..	..	..	..
2002	95.7	97.7	94.7	93.3	..	..	..	..	..	..
2003	98.9	99.1	99.0	98.0	..	..	..	..	..	..
2004	102.6	105.8	101.9	100.8	102.0	103.9	104.7	112.5	101.8	103.5
2005	106.7	113.1	104.2	103.5	105.9	110.3	110.2	123.1	105.3	109.4
2004										
1st Quarter	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2nd Quarter	102.3	105.8	101.8	100.3	102.1	104.8	103.8	110.6	101.3	103.1
3rd Quarter	103.5	108.9	102.6	100.4	102.8	106.3	106.5	118.6	102.3	105.1
4th Quarter	104.4	108.3	103.2	102.5	103.2	104.3	108.6	120.6	103.4	105.7
2005										
1st Quarter	105.0	110.1	102.2	103.2	103.8	106.0	109.4	122.4	103.9	107.4
2nd Quarter	106.3	113.4	103.2	102.9	105.5	110.8	109.9	123.5	104.8	109.2
3rd Quarter	107.0	113.9	104.9	103.0	106.4	111.7	110.1	123.2	105.4	109.6
4th Quarter	108.3	114.9	106.4	104.9	107.7	112.8	111.2	123.3	107.0	111.3

6. Cost index for maintenance of roads. 1st Quarter 2004=100

	Maintenance of road				Asphalt work		Maintenance in wintertime	
	Total	Materials	Machinery	Labour cost	Total	Materials	Total	Materials
1985	50.6	54.9	49.2	46.2	..	..	49.1	58.8
1986	54.4	58.1	53.3	51.4	..	..	53.3	61.5
1987	61.4	62.4	61.0	62.5	..	..	61.5	64.9
1988	65.5	68.0	63.9	65.9	..	..	64.5	70.5
1989	67.6	71.4	65.8	66.3	..	..	66.3	74.4
1990	71.7	75.2	70.0	70.2	..	..	70.4	78.6
1991	76.1	78.3	74.4	76.3	..	..	75.0	80.3
1992	75.1	79.5	73.2	73.0	..	..	73.6	81.2
1993	76.1	79.9	75.3	72.2	..	..	75.1	81.2
1994	77.8	80.8	77.6	72.8	..	..	77.1	82.4
1995	79.2	82.4	79.5	73.5	..	..	78.7	83.4
1996	80.5	83.6	81.1	74.4	..	..	80.2	83.9
1997	81.8	85.3	82.2	75.3	..	..	81.2	85.1
1998	83.0	87.2	82.5	77.9	..	..	81.9	86.2
1999	85.7	89.1	85.6	80.6	..	..	84.9	88.0
2000	90.5	92.0	91.7	84.4	..	..	90.5	91.5
2001	93.3	94.8	93.8	89.2	..	..	93.1	94.2
2002	95.1	97.1	94.7	93.3	..	..	94.6	96.9
2003	98.8	98.6	99.0	98.0	..	..	98.8	98.8
2004	101.7	103.3	102.0	100.8	102.1	103.6	101.6	101.5
2005	106.0	112.6	104.7	103.5	110.0	117.5	105.2	103.2
2004								
1st Quarter	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2nd Quarter	101.4	104.2	101.5	100.3	102.3	104.7	101.0	101.9
3rd Quarter	102.4	105.7	103.2	100.4	103.8	106.8	102.3	102.8
4th Quarter	102.8	103.3	103.4	102.5	102.3	102.7	103.1	101.3
2005								
1st Quarter	103.7	105.2	103.6	103.2	103.6	105.2	103.8	102.3
2nd Quarter	105.5	112.3	104.2	102.9	109.6	117.3	104.7	103.9
3rd Quarter	107.1	115.7	105.7	103.0	112.6	122.4	106.0	103.3
4th Quarter	107.8	117.0	105.2	104.9	114.1	125.2	106.1	103.1

7. New detached houses, price index. 2000=100

Year and quarter	Index
1989	68.5
1990	66.1
1991	64.2
1992	64.1
1993	62.3
1994	65.1
1995	70.4
1996	74.0
1997	77.3
1998	84.2
1999	91.9
2000	100.0
2001	107.8
2002	115.2
2003	119.7
2004	123.1
2005	132.4
2000	
1. quarter	95.3
2. quarter	101.3
3. quarter	100.5
4. quarter	102.9
2001	
1. quarter	103.6
2. quarter	107.8
3. quarter	109.6
4. quarter	110.2
2002	
1. quarter	112.3
2. quarter	114.4
3. quarter	117.8
4. quarter	116.3
2003	
1. quarter	117.7
2. quarter	120.9
3. quarter	120.1
4. quarter	120.2
2004	
1. quarter	120.5
2. quarter	123.6
3. quarter	124.3
4. quarter	123.8
2005	
1. quarter	125.5
2. quarter	132.7
3. quarter	134.6
4. quarter	136.9

8. New multi-dwelling houses, price index. 2000=100

Year and half year	Total	Small houses	Blocks of flats
2000	100.0	100.0	100.0
2001	110.3	108.7	112.1
2002	119.3	118.1	120.8
2003	125.0	121.3	129.6
2004	134.2	129.8	139.4
2005	146.7	137.1	157.7
2000			
1. half-year	99.8	98.0	102.1
2. half-year	100.2	102.0	97.9
2001			
1. half-year	107.2	105.8	108.8
2. half-year	113.4	111.7	115.4
2002			
1. half-year	116.4	115.7	117.2
2. half-year	122.3	120.4	124.4
2003			
1. half-year	121.6	118.6	125.3
2. half-year	128.5	124.0	133.9
2004			
1. half-year	134.3	130.0	139.4
2. half-year	134.1	129.6	139.4
2005			
1. half-year	142.7	130.9	156.1
2. half-year	150.6	143.3	159.4

9. House price index[1]. All dwellings. 2000=100

	Total	Oslo with Bærum	Rest of Akershus	Stavanger, Bergen and Trondheim	Rest of the country
Dwellings, total					
1991	0.0	0.0	0.0	0.0	0.0
1992	46.8	34.9	41.6	44.9	56.8
1993	47.2	36.2	41.5	47.0	56.3
1994	53.4	43.5	47.4	54.0	61.5
1995	57.3	45.8	52.3	57.8	66.2
1996	62.6	52.1	59.1	61.8	70.9
1997	69.9	61.9	67.2	68.8	76.4
1998	77.7	71.9	76.0	76.5	82.5
1999	86.4	83.5	85.3	85.5	89.0
2000	100.0	100.0	100.0	100.0	100.0
2001	107.0	106.8	104.5	107.6	107.7
2002	112.3	113.4	108.9	117.8	111.2
2003	114.2	112.1	110.7	125.3	113.2
2004	125.8	123.5	120.2	144.2	123.7
2005	136.2	134.7	128.9	160.1	132.8
2004					
1. quarter	123.9	119.8	118.5	139.4	123.0
2. quarter	125.8	122.1	120.7	142.3	124.5
3. quarter	126.1	125.2	120.1	146.2	123.1
4. quarter	127.4	126.7	121.4	148.7	124.1
2005					
1. quarter	133.7	131.5	126.9	155.8	130.9
2. quarter	137.4	133.2	129.1	160.2	135.5
3. quarter	136.2	136.8	129.2	160.8	131.8
4. quarter	137.4	137.2	130.2	163.5	133.0
Detached houses					
1991	57.0	37.9	45.7	48.5	61.6
1992	54.7	37.5	43.6	48.0	58.8
1993	55.1	40.3	43.1	50.6	58.7
1994	60.8	45.5	47.3	57.5	64.4
1995	65.8	52.0	52.8	62.4	69.1
1996	70.9	56.8	60.9	66.5	73.8
1997	77.3	67.9	69.3	73.1	79.1
1998	83.0	75.8	77.0	80.3	84.3
1999	89.5	84.2	85.6	88.4	90.3
2000	100.0	100.0	100.0	100.0	100.0
2001	107.1	107.1	103.7	105.9	107.5
2002	110.1	108.4	109.1	112.6	109.6
2003	111.9	106.2	110.4	120.3	111.2
2004	122.8	114.9	120.2	138.0	121.6
2005	132.2	124.1	128.0	151.5	130.7
2004					
1. quarter	121.9	109.0	119.1	134.6	121.9
2. quarter	123.4	116.1	120.9	135.7	122.5
3. quarter	122.6	118.4	120.0	140.1	120.5
4. quarter	123.3	116.2	120.6	141.7	121.6
2005					
1. quarter	130.4	123.6	126.3	147.0	129.1
2. quarter	134.6	122.1	129.0	153.1	134.1
3. quarter	131.2	125.3	128.5	151.3	129.1
4. quarter	132.4	125.2	128.0	154.6	130.4

9 (cont.). House price index[1]. All dwellings. 2000=100

	Total	Oslo with Bærum	Rest of Akershus	Stavanger, Bergen and Trondheim	Rest of the country
Small houses					
1991	0.0	0.0	0.0	0.0	0.0
1992	45.3	37.3	40.9	46.6	54.0
1993	45.4	37.6	40.6	49.2	52.5
1994	52.4	46.7	47.9	56.0	57.5
1995	56.3	48.8	53.0	60.2	62.4
1996	61.2	55.6	57.4	63.2	66.8
1997	68.8	64.7	65.8	70.5	73.0
1998	77.6	74.8	76.0	78.0	80.6
1999	86.4	85.1	85.8	86.6	87.6
2000	100.0	100.0	100.0	100.0	100.0
2001	106.2	105.6	104.9	106.1	107.4
2002	112.1	111.8	107.6	112.1	113.8
2003	114.2	109.2	109.9	118.2	116.9
2004	125.7	119.9	119.2	134.7	127.3
2005	137.8	133.3	129.7	152.4	136.2
2004					
1. quarter	121.7	117.8	115.7	128.4	123.0
2. quarter	125.4	118.2	119.2	134.3	127.8
3. quarter	127.0	120.4	119.5	136.3	129.1
4. quarter	128.7	123.1	122.4	139.7	129.1
2005					
1. quarter	134.0	127.0	127.0	149.0	133.5
2. quarter	137.5	134.6	128.5	150.3	136.2
3. quarter	139.6	136.8	129.1	154.3	137.5
4. quarter	140.1	134.9	134.3	156.0	137.7
Multi-dwelling houses					
1991	0.0	0.0	0.0	0.0	0.0
1992	36.0	33.2	36.6	40.0	46.9
1993	36.9	34.5	36.6	40.9	45.7
1994	43.6	41.6	43.4	48.7	49.1
1995	45.6	43.1	46.3	51.2	52.6
1996	51.9	49.8	54.0	56.0	57.6
1997	61.1	60.0	62.6	63.8	63.0
1998	71.0	70.4	72.1	71.6	72.9
1999	82.9	83.3	83.4	82.5	81.3
2000	100.0	100.0	100.0	100.0	100.0
2001	107.9	107.4	105.2	109.5	109.8
2002	116.7	114.9	111.6	125.1	118.9
2003	119.1	115.0	115.9	133.6	123.9
2004	133.0	127.8	123.5	157.3	135.1
2005	144.8	138.9	133.7	173.2	146.4
2004					
1. quarter	129.7	125.1	122.1	152.8	129.7
2. quarter	130.8	124.8	123.7	154.0	136.0
3. quarter	134.3	128.9	122.8	159.8	136.7
4. quarter	137.2	132.4	125.2	162.5	137.9
2005					
1. quarter	141.3	135.7	130.9	168.7	142.4
2. quarter	142.9	136.2	132.3	173.6	145.5
3. quarter	146.4	140.8	135.3	173.7	148.2
4. quarter	148.4	142.7	136.4	176.7	149.5

[1] Index numbers beginning 1. quarter 2002, are calculated using data from the Norwegian Association of Real Estate Agents, the Association of Real Estate Undertakings, FINN.no and the Norwegian Federation of Cooperative Housing Associations (NBBL). Earlier numbers are calculated by weighing together the price index for second-hand dwellings (Statistics Norway) and numbers from NBBL.

10. House price index[1]. Freeholder. 2000=100

	Total	Oslo with Bærum	Rest of Akershus	Stavanger, Bergen and Trondheim	Rest of the country
Dwellings, total					
1991	52.2	38.6	45.8	47.7	60.5
1992	49.6	36.3	42.4	46.2	57.7
1993	50.0	37.2	42.3	48.7	57.3
1994	56.5	45.0	48.0	55.5	62.7
1995	60.8	47.7	53.1	59.7	67.4
1996	65.9	53.5	60.0	63.7	72.1
1997	73.1	62.4	67.6	70.1	77.7
1998	80.2	72.2	76.4	77.9	83.4
1999	87.7	82.8	85.4	86.2	89.7
2000	100.0	100.0	100.0	100.0	100.0
2001	107.1	106.2	104.5	107.2	107.6
2002	111.4	112.2	108.7	115.7	110.5
2003	113.2	110.3	110.6	122.9	112.4
2004	124.5	121.5	120.2	141.6	123.0
2005	134.4	131.7	128.7	156.8	132.0
2004					
1. quarter	123.0	118.0	118.5	136.7	122.7
2. quarter	124.7	120.7	120.6	139.5	123.7
3. quarter	124.7	123.6	120.3	143.5	122.2
4. quarter	125.7	123.8	121.2	146.5	123.2
2005					
1. quarter	132.2	128.8	126.8	152.9	130.3
2. quarter	136.0	130.4	129.2	156.8	135.0
3. quarter	134.3	134.1	129.1	157.5	130.8
4. quarter	135.1	133.6	129.8	160.1	131.9
Detached houses					
1991	57.0	37.9	45.7	48.5	61.6
1992	54.7	37.5	43.6	48.0	58.8
1993	55.1	40.3	43.1	50.6	58.7
1994	60.8	45.5	47.3	57.5	64.4
1995	65.8	52.0	52.8	62.4	69.1
1996	70.9	56.8	60.9	66.5	73.8
1997	77.3	67.9	69.3	73.1	79.1
1998	83.0	75.8	77.0	80.3	84.3
1999	89.5	84.2	85.6	88.4	90.3
2000	100.0	100.0	100.0	100.0	100.0
2001	107.1	107.1	103.7	105.9	107.5
2002	110.1	108.4	109.1	112.6	109.6
2003	111.9	106.2	110.4	120.3	111.2
2004	122.8	114.9	120.2	138.0	121.6
2005	132.2	124.1	128.0	151.5	130.7
2004					
1. quarter	121.9	109.0	119.1	134.6	121.9
2. quarter	123.4	116.1	120.9	135.7	122.5
3. quarter	122.6	118.4	120.0	140.1	120.5
4. quarter	123.3	116.2	120.6	141.7	121.6
2005					
1. quarter	130.4	123.6	126.3	147.0	129.1
2. quarter	134.6	122.1	129.0	153.1	134.1
3. quarter	131.2	125.3	128.5	151.3	129.1
4. quarter	132.4	125.2	128.0	154.6	130.4

10 (cont.). House price index[1]. Freeholder. 2000=100

	Total	Oslo with Bærum	Rest of Akershus	Stavanger, Bergen and Trondheim	Rest of the country
Small houses					
1991	50.4	38.3	46.3	48.5	57.5
1992	48.1	37.2	42.0	46.8	54.9
1993	48.2	37.3	41.8	49.8	53.5
1994	54.8	46.8	48.5	56.6	58.4
1995	59.7	49.0	54.2	61.2	63.7
1996	64.0	56.1	58.2	64.1	68.3
1997	71.1	64.5	65.8	70.6	74.8
1998	79.3	74.7	76.3	78.1	81.9
1999	87.1	84.4	85.6	86.4	88.7
2000	100.0	100.0	100.0	100.0	100.0
2001	106.9	105.5	105.9	105.5	108.0
2002	112.2	111.5	108.8	110.3	113.7
2003	114.0	108.9	111.8	115.5	116.8
2004	126.1	120.0	121.0	132.8	127.7
2005	138.1	133.1	132.3	149.9	136.1
2004					
1. quarter	122.1	117.7	117.2	126.0	123.8
2. quarter	125.4	118.0	120.7	131.9	127.9
3. quarter	127.6	121.4	122.2	134.1	129.4
4. quarter	129.3	122.7	124.0	139.1	129.5
1. quarter	134.4	126.5	129.3	147.3	133.9
2. quarter	138.2	134.9	131.4	147.3	136.6
3. quarter	140.1	137.1	131.4	151.8	137.6
4. quarter	139.7	133.9	137.0	153.1	136.4
Multi-dwelling houses					
1991	43.9	38.7	44.2	45.8	57.3
1992	40.7	35.5	39.7	43.1	54.6
1993	41.2	36.0	39.9	45.5	53.4
1994	48.7	44.4	47.5	52.1	58.1
1995	51.1	46.1	50.7	55.1	62.0
1996	56.6	51.8	58.8	60.6	67.0
1997	64.3	60.4	64.2	66.9	72.2
1998	73.4	70.4	73.9	75.6	79.2
1999	83.3	82.0	84.3	84.1	86.4
2000	100.0	100.0	100.0	100.0	100.0
2001	107.6	106.3	105.5	110.8	108.5
2002	114.6	112.8	107.9	122.6	116.3
2003	115.9	112.0	112.4	132.8	123.0
2004	130.6	125.7	121.4	158.0	136.5
2005	140.0	133.8	131.3	171.9	150.4
2004					
1. quarter	128.9	124.9	120.1	152.6	132.0
2. quarter	127.9	122.9	121.2	153.0	135.5
3. quarter	131.2	126.1	121.3	160.7	137.5
4. quarter	134.2	128.9	123.0	165.5	140.9
2005					
1. quarter	137.3	131.2	130.2	167.9	147.4
2. quarter	137.0	130.5	127.9	170.1	148.9
3. quarter	142.2	136.0	134.1	174.5	151.9
4. quarter	143.5	137.6	133.0	174.9	153.5

[1] Index numbers beginning 1. quarter 2002, are calculated using data from the Norwegian Association of Real Estate Agents, the Association of Real Estate Undertakings, FINN.no and the Norwegian Federation of Cooperative Housing Associations (NBBL). Earlier numbers are identical to Statistics Norway's price index for second-hand dwellings.

11. House price index[1]. Housing cooperative. 2000=100

	Total	Oslo with Bærum	Rest of Akershus	Stavanger, Bergen and Trondheim	Rest of the country
Dwellings, total					
1992	38.2	31.8	35.9	41.0	47.9
1993	39.2	34.3	35.9	41.8	46.7
1994	45.5	40.5	43.0	49.5	50.7
1995	47.8	41.9	46.1	52.1	54.3
1996	53.6	49.1	52.8	56.2	58.9
1997	63.3	60.8	63.6	65.0	64.5
1998	71.2	71.2	73.2	72.4	73.5
1999	82.9	85.0	84.1	83.5	81.9
2000	100.0	100.0	100.0	100.0	100.0
2001	108.1	108.0	104.0	108.7	108.3
2002	118.1	116.1	109.7	123.6	117.7
2003	121.1	116.6	111.2	131.9	121.3
2004	133.3	127.9	119.5	151.6	130.9
2005	146.5	141.8	128.9	169.5	141.3
2004					
1. quarter	128.9	123.9	117.5	147.2	125.4
2. quarter	132.5	125.2	120.6	150.4	132.4
3. quarter	134.6	128.7	117.4	154.2	133.0
4. quarter	137.2	133.7	122.6	154.6	132.8
2005					
1. quarter	142.3	137.8	126.0	164.2	137.0
2. quarter	145.4	139.9	127.6	170.0	140.1
3. quarter	147.7	143.3	129.3	170.1	142.5
4. quarter	150.7	146.0	132.6	173.6	145.4
Small houses					
1992	45.1	37.6	37.7	46.2	51.8
1993	45.4	39.1	37.3	47.5	50.3
1994	51.9	46.4	46.2	54.2	55.3
1995	54.8	47.8	49.5	57.4	59.1
1996	59.2	53.4	55.1	60.4	63.1
1997	68.6	65.7	66.0	70.4	68.8
1998	75.4	75.2	75.3	77.9	77.4
1999	85.3	88.3	86.6	87.4	85.0
2000	100.0	100.0	100.0	100.0	100.0
2001	106.3	106.1	102.2	107.9	105.8
2002	114.5	113.6	104.4	117.8	114.4
2003	117.2	111.1	103.8	126.4	117.5
2004	127.3	119.6	113.4	140.3	126.5
2005	140.1	134.4	121.7	159.8	136.8
2004					
1. quarter	123.2	118.4	110.9	135.6	121.2
2. quarter	128.4	119.5	114.6	141.6	128.0
3. quarter	127.8	115.3	110.7	143.0	128.7
4. quarter	129.8	125.3	117.2	140.9	128.1
2005					
1. quarter	135.7	129.2	119.8	153.7	132.7
2. quarter	138.6	133.0	119.4	159.2	135.3
3. quarter	141.1	135.2	121.9	161.8	137.6
4. quarter	145.0	140.0	125.5	164.6	141.7
Multi-dwelling houses					
1992	35.6	31.4	34.5	39.0	44.4
1993	37.0	33.3	34.5	39.4	43.2
1994	43.2	39.3	40.7	47.5	46.2
1995	45.2	40.7	43.4	49.8	49.6
1996	51.7	48.2	50.9	54.3	54.6
1997	61.6	59.8	61.6	62.7	60.1
1998	69.8	70.4	71.0	70.2	70.8
1999	82.4	84.3	82.7	82.0	79.7
2000	100.0	100.0	100.0	100.0	100.0
2001	108.9	108.3	104.9	109.0	110.3
2002	120.0	116.5	113.8	126.0	119.7
2003	123.1	117.7	117.9	133.9	123.9
2004	136.6	129.4	124.0	156.9	134.2
2005	150.1	143.1	134.4	173.6	144.5
2004					
1. quarter	132.0	124.9	122.6	152.8	128.5
2. quarter	134.6	126.3	124.7	154.3	135.8
3. quarter	138.3	131.1	122.8	159.4	136.1
4. quarter	141.3	135.3	125.9	161.3	136.4
2005					
1. quarter	146.0	139.4	130.2	169.0	140.1
2. quarter	149.0	141.1	134.5	174.8	143.8
3. quarter	151.4	144.8	135.1	173.4	146.3
4. quarter	153.9	147.2	137.8	177.3	147.6

[1] Index numbers beginning 1. quarter 2002, are calculated using data from the Norwegian Association of Real Estate Agents, the Association of Real Estate Undertakings, FINN.no and the Norwegian Federation of Cooperative Housing Associations (NBBL). Earlier numbers are calculated by NBBL.

12. Price index for office and business properties. 2000=100

Year and half year	Index
1996	70.6
1997	80.2
1998	90.1
1999	91.7
2000	100.0
2001	111.1
2002	108.5
2003	110.5
2004	123.3
2005	130.5
2000	
1. half-year	101.1
2. half-year	99.0
2001	
1. half-year	114.6
2. half-year	107.5
2002	
1. half-year	111.4
2. half-year	105.5
2003	
1. half-year	106.7
2. half-year	114.2
2004	
1. half-year	124.6
2. half-year	122.0
2005	
1. half-year	132.0
2. half-year	128.9

Websites

Websites for the price indices and other price statistics mentioned in this publication are listed below:

- Construction cost index for residential buildings: www.ssb.no/bkibol_en
- Construction cost index for plumbing work in office and commercial buildings: www.ssb.no/bkiror_en
- Construction cost index for civil engineering works www.ssb.no/bkianl_en
- Price index for new detached houses www.ssb.no/enebolig_en
- Price index for new multi-dwelling houses www.ssb.no/flerbolig_en
- House price index www.ssb.no/bpi_en
- Price index for office and business properties www.ssb.no/pfki_en

Other price statistics

- Prices per square meter for detached houses: www.ssb.no/kvadenebol_en
- Transfer of properties: www.ssb.no/eiendomsoms_en

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Other price statistics

Thomassen Arild, Jensen Roger (1998): *Kvadratmeterpriser for skolebygg.* Rapporter 98/9, Statistics Norway

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