

**Documentation of statistics for
Construction cost index for residential buildings 2022**

1 Introduction

The construction cost index for residential buildings reflects the evolution of housing construction costs in Denmark. The index is used, among other things, to regulate building contracts. The primary users of this index are construction organizations, entrepreneurs, housing developer, professional craftsmen, solicitors, public institutions and the EU. The construction cost index has been published since the first quarter of 2003 and replaces the former construction cost index.

2 Statistical presentation

The construction cost index for residential buildings is produced each quarter to follow the change in construction costs for residential buildings in Denmark. The index is published for a one-family house and a multi-family house, in addition to all residential buildings which is based on a weighting of the two indices. All indices are further more broken down into eight sub-indices by profession and six sub-indices by building parts. Both the total indices and the sub-indices are divided into material costs and labour costs.

2.1 Data description

The construction cost index for residential buildings is a quarterly index delineated by labour costs, material costs and equipment costs for a typical residential building in Denmark. The published indices reflect costs in comparison to a reference period (2015), and therefore do not illuminate the actual cost levels. The index is delineated for a one-family house and a multi-family house, in addition to an index for the total. The index is further delineated into seven sub-indices by profession and six sub-indices by building parts as well as material costs and labour costs.

The index encompasses costs incurred when raising a residential building, i.e. costs of labour, equipment and materials for the entrepreneur. However, costs associated with the plot, architect, etc. are not included the computation of the construction cost index.

The index shows a quarterly change in construction costs for residential buildings and is calculated on the basis of a fixed basket of commodities. Thus, the construction costs are associated with the same type of residential building. The composition of the index is based on an analysis of actual constructions of residential buildings, primarily from information obtained from Dwelling- and Housingregister (BBR).

The weights used in the construction cost index for residential buildings are based on business accounts from three actual residential buildings: a one-family house, a terraced house and a multi-family house. The business accounts are collected from three entrepreneurs of different sizes and geographic location. During the processing of this data, an engineer specialised in pricing of residential buildings has been consulted. The collected information is processed so that each construction part, e.g., the mounting of a concrete wall element, is specified by materials, in this case concrete, by equipment, e.g., building crane, and by type of labour, e.g., concrete element work, that is required, and the associated costs.

Approximately every fifth year the three types of residential buildings are assessed on the basis of their relevance as representing the typical residential building in question. The weights were last updated as of the 1st quarter 2016 where both the weighting- and reference period were altered to 2015.

Labour costs cover wages and salaries, in addition to other social benefits covered by the employer. In the construction cost index for residential buildings, labour costs cover the compensation of employees that constitute the total earnings of employees. The total earnings includes the employee's wages and salaries paid by the employer including pension contributions by the

employee and the employer to the employee. The remaining parts of the labour costs include those costs associated with the employee-employer relation, which does not have the character of direct earnings for the employee, i.e. social contributions from public funds, education costs, voluntary personnel costs, etc.

Material costs cover all costs from materials and equipment. Up to April 2004 material and equipment costs were calculated on the basis of actual prices paid by producers/ importers excl. VAT. This means that the prices used were net of discounts of the actual sale of the materials or equipment. As of April 2004, the prices collected are the importers' purchasing price c.i.f. (i.e. including cost, insurance and freight) excl. taxes and fees, instead of the final sales prices that were collected previously.

The division into building parts is based on the Danish classification of building elements; [SfB Bygningsdeltavlen](#).

The division into profession components is based on the different costs associated with the respective building trades.

Costs associated with organization and operation of construction sites have been distributed equally between the different profession components and building parts.

2.2 Classification system

The construction cost index for residential buildings can be grouped by housing types, professions, building parts, fixtures, as well as material and labor costs.

The index can be subdivided by housing types: one-family houses; multi-family houses; residential buildings in total.

The index can be subdivided by professions:

- Earth and concrete work
- Concrete slab work
- Bricklaying
- Carpentry and joinery (in indices from prior to 2015, this profession is divided into separate professions Carpentry and Joinery)
- Painting
- Heating and sanitary engineering
- Electrical work

The division of professions are based on the relevant profession that are included in the labor costs and are classified by [DISCO-o8](#). The industries that information are collected from are determined by the industry code [DBo7](#).

The index can be subdivided by building parts:

- Subgrade
- Raw buildings
- Completion of buildings
- Surfaces
- Heating and sanitary installations
- Electrical and mechanical installations

Labor costs and material costs are not subdivided further.

2.3 Sector coverage

The construction sector.

2.4 Statistical concepts and definitions

Labor Costs: The price concept of labor costs is the actual earnings plus other labor costs, including employers' payments of social contributions. Only the labor costs of persons directly involved in the construction process are included.

Building part index: The indices for one-family house, multi-family house, and residential buildings in general are divided into subindices for professions and building parts. Each are further divided into materials and labor costs. The following building parts indices are included:

- Subgrade
- Raw buildings
- Completion of buildings
- Surfaces
- Heating and sanitary installations
- Electrical and mechanical installations

Costs associated with organization and operation of construction sites have been distributed equally between the different profession components and building parts.

Profession index: The indices for one-family house, multi-family house, and residential buildings in general are divided into subindices for professions and building parts. Each are further divided into materials and labor costs. The following profession indices are included:

- Earth and concrete work
- Concrete slab work
- Bricklaying
- Carpentry and joinery (in indices from prior to 2015, this profession is divided into separate professions Carpentry and Joinery)
- Painting
- Heating and sanitary engineering
- Electrical work

Costs associated with organization and operation of construction sites have been distributed equally between the different profession components and building parts.

Material prices: The concept of material prices for imported commodities is actual transaction prices c.i.f. excluding all duties and taxes on the goods. For commodities for the home market the concept of material prices is actual transaction prices ex producer, excluding VAT and excise duties, and taking both general and specific discounts into consideration.

Weights: Weighing of different cost units in the construction cost index is based on accounting data from three actual building constructions: One one-family house, One semi-detached house, One multifamily house. The buildings were chosen as representation of typical housing constructions on the basis of an analysis of actual housing constructions during the weight reference period.

The data for the three types of buildings are obtained from contractors of different size and geographic location. A consulting contractor specialized in pricing of housing construction was involved in the processing of the data.

2.5 Statistical unit

Costs.

2.6 Statistical population

The indices represent the construction of residential buildings in all of Denmark.

2.7 Reference area

Denmark.

2.8 Time coverage

2003-

2.9 Base period

2015=100.

2.10 Unit of measure

Index values and percentage change.

2.11 Reference period

The construction cost index for residential buildings is compiled quarterly, i.e. the relevant index number is representative for average costs in the relevant quarter.

2.12 Frequency of dissemination

Quarterly.

2.13 Legal acts and other agreements

Act concerning Statistics Denmark § 8, as subsequently amended (most recently by Act no. 599 of 22 June, 2000).

Council Regulation (EC) No 1165/98 of 19th May 1998 about business cycle statistics and the Commission Regulation (EC) No 588/2001.

2.14 Cost and burden

There is a miniscule direct response burden since the majority of the data used in production are obtained from other statistics in Statistics Denmark.

2.15 Comment

Further information on the construction cost index for residential buildings can be found on the [subject page](#) or can be obtained by contacting Statistics Denmark, Prices and Consumption.

3 Statistical processing

The Construction cost index is based on three actual housing constructions. The constructions are typical for the construction of residential building in Denmark and are selected on the basis of an analysis of the current construction. The costs of the three constructions forms the weights of the indices. These weights are used to weigh together the prices of the cost components.

3.1 Source data

Prices for materials and equipment are mainly collected from the Price Index for Domestic Supply. Prices of around 950 different materials are collected every month from producers and importers, cf the declaration of contents for Price Index for Domestic Supply. Prices are also gathered from Molio Prisdatabasen.

The prices of total labour costs are mainly collected from the Indices of Average Earnings for the private sector. The prices are collected each quarter and refer to the second month of the quarter, cf the declaration of contents for Indices of Average Earnings for Private Sector.

Prices of transportation are collected quarterly from the Producer price index for services, from which prices of Freight transport by road and removal services are used.

Weighing of different cost units in the construction cost index is based on three concrete buildings: One one-family house, One semi-detached house, One multi-family house. The buildings were chosen as representation of typical housing constructions on the basis of an analysis of actual housing constructions during the weight reference period. The data for the three types of buildings are obtained from contractors of different size and geographic location. A consulting contractor specialized in pricing of housing construction was involved in the processing of the data.

3.2 Frequency of data collection

Primarily monthly and quarterly. Some prices are only gathered on a yearly basis.

Most prices used in the calculation of the index are three-month averages for the price of materials or services on the 15th day of each month in the quarter. If the price of a material or service on the 15th day cannot be gathered, the price is gathered from a suitable day earlier in the month, or an average of prices in the first 15 days of the month is used. The three-month average price is considered representative for the entire quarter.

3.3 Data collection

Material prices are collected for the Danish Producer Price Index (PPI) via [Virk](#), and are reported by select, representative companies. The Construction Cost Index uses PPI-prices belonging to NACE Rev. 2 Section F. There are about 950 material prices forming about 120 representative material goods. Labor Costs are collected for the Danish indices for average earnings in the private sector. The Construction Cost Index uses earnings for NACE Rev. 2 Section F. Furthermore, material prices are collected from Molio Prisdatabasen.

Prices representing freight transport are gathered from the Producer price Index for Services, and are also collected via [Virk](#).

Labor costs are gathered from Implicit index of average earnings

3.4 Data validation

The data validation is handled by the Price Index for Domestic Supply and Indices of Average Earnings for the Private Sector. The first validation of price data happens when prices arrive. Here they are tested for unusual changes. The prices that do not pass the threshold value will be checked manually by the staff and accepted only if the firms can verify the change.

When all prices are received, the system generates a list that includes all price changes and a measure of how these affects the elementary aggregates. The last validation is a visual inspection of all index tables.

3.5 Data compilation

The Construction cost index for residential buildings consists of a hierarchical system, where the collected prices are first divided into a number of product groups. The groups are aggregated to base aggregates from which base prices are calculated as geometric averages. Base prices are used to calculate base indices, which show the development of base prices in successive time periods. Base indices constitute the most detailed index level. On the basis of base indices, aggregated subindices are done using Laspeyres type index calculations. Finally, aggregated total indices are calculated, which are the top level of the index hierarchy.

Weighing of prices in the Construction cost index for residential buildings is based on classification codes and weights for the different types of housing constructions. Weights are updated approximately every fifth year.

Weighing of different cost units in the construction cost index is based on accounting data from three actual building constructions: One one-family house, One semi-detached house, One multi-family house. The buildings were chosen as representation of typical housing constructions on the basis of an analysis of actual housing constructions during the weight reference period. The data for the three types of buildings are obtained from contractors of different size and geographic location. A consulting contractor specialized in pricing of housing construction was involved in the processing of the data.

The accounting data used is comprised of different production parts, e.g., assembly of a concrete wall, which is divided into costs of involved materials (e.g., concrete), equipment (e.g., crane), and profession (e.g., concrete slab work). This is the basis of price weights. Costs of usage and operation of construction sites, including winter specific measures, is distributed proportionally to the different professions and materials.

3.6 Adjustment

Substitution of the products used in calculation of the index may occur over time. Because such new products may be of a different quality than the previous, continuous quality control of is performed.

No other data corrections are carried out, except for the methods described in the data validation section.

4 Relevance

The index is used for contract regulation and to follow the economic development in construction costs. The primary users of this index are construction organizations, entrepreneurs, housing developer, professional craftsmen, solicitors, public institutions and the EU.

4.1 User Needs

The construction cost index has two primary purposes. The index is used for contract regulation and to follow the economic development in construction costs. The primary users of this index are construction organizations, entrepreneurs, housing developer, professional craftsmen, solicitors, public institutions and the EU.

The index is also reported to Eurostat as part of domestic indices construction costs for residential buildings

4.2 User Satisfaction

No information is collected on user satisfaction.

4.3 Data completeness rate

The statistics fulfill the demands set by Eurostat.

5 Accuracy and reliability

The construction cost index for residential buildings covers the typical residential house building in Denmark. The three buildings used to represent typical housing construction have been chosen on the basis of an analysis of typical house building from the Central Register of Buildings and Dwellings (BBR).

Measures on accuracy are not available.

5.1 Overall accuracy

The Construction cost index for residential buildings is calculated based on the assumption that three chosen housing constructions are valid representations of the actual costs of constructing a house in Denmark. In the case of significant changes in the typical construction of houses, this could affect the accuracy of the index.

The index is based on the development of about 200 representative goods which cover about 20 work functions, about 52 material groups and about 10 equipment groups. To each representative goods a number of prices/goods are attached. It is not possible to determine sampling accuracy, as prices are not collected randomly. However, representative goods are chosen on the basis of the costs of three actual, typical housing construction projects, using principles of importance and representation. It is therefore assumed that price developments of the collected prices are representative of price development in actual housing constructions.

Continuous monitoring and improvement of the quality of pricing data and weights means that the index is evaluated as being of high quality and representative of the general development of house building costs in Denmark.

5.2 Sampling error

The index is based on the development of about 200 representative goods which cover about 20 work functions, about 52 material groups and about 10 equipment groups. To each representative goods a number of prices/goods are attached. It is not possible to determine sampling accuracy, as prices are not collected randomly. However, representative goods are chosen on the basis of the costs of three actual, typical housing construction projects, using principles of importance and representation. It is therefore assumed that price developments of the collected prices are representative of price development in actual housing constructions.

5.3 Non-sampling error

Not relevant for these statistics.

5.4 Quality management

Statistics Denmark follows the recommendations on organisation and management of quality given in the Code of Practice for European Statistics (CoP) and the implementation guidelines given in the Quality Assurance Framework of the European Statistical System (QAF). A Working Group on Quality and a central quality assurance function have been established to continuously carry through control of products and processes.

5.5 Quality assurance

Statistics Denmark follows the principles in the Code of Practice for European Statistics (CoP) and uses the Quality Assurance Framework of the European Statistical System (QAF) for the implementation of the principles. This involves continuous decentralized and central control of products and processes based on documentation following international standards. The central quality assurance function reports to the Working Group on Quality. Reports include suggestions for improvement that are assessed, decided and subsequently implemented.

5.6 Quality assessment

Overall the Construction Cost index for residential buildings is assessed to be of good quality and representative of the construction of residential housing in Denmark. The weight basis for the index is based three housing constructions chosen through a thorough analysis of typical residential, housing constructions in Denmark. Every five years the weight basis is updated in order to reflect the contemporary state of housing construction.

The gathered price data is continuously monitored in order to raise the data quality. This may include substitution or addition of reporting companies, changes in the reported products, or changes in applied price definitions and calculations. Improvements to the price gathering process is accomplished through running dialogue with involved companies.

In order to minimize errors, the index is calculated in a dedicated computer price index system.

5.7 Data revision - policy

Statistics Denmark revises published figures in accordance with the [Revision Policy for Statistics Denmark](#). The common procedures and principles of the Revision Policy are for some statistics supplemented by a specific revision practice.

5.8 Data revision practice

Only final statistics are calculated.

6 Timeliness and punctuality

The statistics are published quarterly, approximately 60 days after the end of the quarter: primo March (Q4), primo June (Q1), primo September (Q2) and primo December (Q3). Yearly statistics are published once per year in connection with publication of the 4th quarter. The statistics are normally published without delay in relation to the announced time of publication.

6.1 Timeliness and time lag - final results

The construction cost index for residential buildings is published primo March (quarter 4), primo June (quarter 1), primo September (quarter 2) and primo December (quarter 3). Yearly statistics are published once per year in connection with publication of the 4th quarter.

6.2 Punctuality

The statistics are generally published without delay in relation to the scheduled publication date.

7 Comparability

See "Comparability over time (QPI/CC for U)".

7.1 Comparability - geographical

Construction Costs Indices for Residential Buildings is regulated by the EU, thus, all EU countries must transmit indices to Eurostat. The Construction Costs Indices for Residential Buildings is directly comparable to the indices produced by other EU-countries for this statistic.

7.2 Comparability over time

It is possible to chain and compare the new construction cost index for residential buildings with the former construction cost index. However, when comparing the two indices it should be borne in mind that it is not the development of prices for similar buildings that are compared but different kinds of buildings that are constructed using different techniques, materials and in periods with different legal demands. This means that not only the weighting scheme but also the methods for collecting prices and calculating the indices are different.

There have been changes the following years:

The first construction cost index was published in 1920 and was an *index for smallholding* (indeks for husmandsbrug). The index had base year in 1914. The house was not very well described. Only that it contained 3 rooms, kitchen, laundry and stable. Because of that there were great inequalities in the data reported by the cost surveyors.

In 1926 a new collection of information about a specific type of house was started. By that means it was possible to follow the price development independent of any improvements of the furniture in the house. This index was revised in 1959 when it was decided to use a farmhouse and a farm building from a type book of the ministry of agriculture. 1959 was base year. Calculation of this index was finished in 1970.

In 1940 a new monthly index for a block of flats was published. This index should measure the development in the costs of residential construction. Base year for this index was 1939. This index was replaced in 1955 by a quarterly index. The weighting scheme of the quarterly index was established on an index house. This index house was a residential construction in 3 storeys with 6 staircases and 36 apartments. In this index 1955 was base year. It was still calculated in 1972 for the sake of long-term contracts even if new indices were published from

1969 and 1971. These two new indices were construction cost indices for one-family houses and a block of flats. As a new concept there were calculated indices by profession and by building parts. The former construction cost index replaced the two indices for one-family houses and a block of flats in 1989. 1987 is base year. The change from two to one index was made because there was no longer any significant difference between the method in construction and choice of materials.

The present construction cost index is once again divided into an index for one-family houses and one for multi-family houses and thus meets the demands from the users of the index. 2003 is base year.

Differences in classification: As mentioned above only one total construction cost index was published until the publication of the two indices for one-family houses and a block of flats in 1969 and 1971. Hereafter, indices were calculated by profession and by building parts.

Differences in the concept of price: The monthly construction cost index published from 1939 to 1955 was calculated on the basis of information from the Wholesale price index about 20 of the most important construction materials. The labour costs were calculated on the basis of changes in the collective agreed wages in the construction industry. The index included in this way the direct expenses and excluded cost of engineers and architects. In 1955 the concept of price was changed. After this Statistics Denmark collected prices for 132 of the most important or most representative

materials. The collected prices were net prices i.e. the invoice prices the master had to pay the supplier of materials excluding general discounts and any profits and including any given duty (i.e. including purchase tax (oms) per 1.8.1962 and VAT per 3.7.1967). The labour costs were calculated on the basis of the current price list in the provinces. The price list was based on collective agreements including social contributions among other things allowance for public holiday.

In the two indices published from 1969 to 1989 a larger number of representative goods were used than in the earlier indices. The material cost index was calculated on the basis of gross prices excluding VAT. The material costs excluded masters fee and other profits. The labour cost index was calculated on the basis of price lists in the different construction trades.

The material cost index in the former construction cost index from 1987 was calculated on the basis of list prices and gathered information on producer prices deducted general discounts. The calculation of labour costs was made on the basis of collective agreement wages including compulsory employers' contributions. The former index is comparable with the indices from 1968 and because of the parallel calculation of the indices in the period from 1987 to 1989 it is possible to regulate contracts back to 1968.

In 2003 the Construction Cost Index for residential buildings was established. The material cost index in this index is calculated on the basis of prices collected from the Price Index for Domestic Supply where both general and specific discounts are deducted. The labour cost index is calculated on the basis of the Indices of Average Earnings for the Private Sector which contains information on each employees earnings etc.

In 2016 the weights for the Construction Cost Index was updated so that 2015=100. The index still follows the same principles as the index in 2003.

7.3 Coherence - cross domain

Methodologically, the calculations of the labour cost indices are now more similar to the calculation of the indices of average earnings, also performed by Statistics Denmark, than previously. I.e., the wage indices are now calculated across all types of employments in the construction industry and not just employments linked directly to the construction process. This makes the indices more comparable to the index of average earnings for the construction sector than previously. As with the index of average earnings for the construction sector the wage indices for the Construction cost index are now calculated at company level rather than employee level, as was the case up until now. This makes the indices more robust to changes in employments.

Furthermore, the basis for calculation is more comparable between the labour cost indices and the indices of average earnings, as they now apply the same data editing procedures.

The construction cost index uses prices from the Price index for Domestic Supply (PRIS1115) and Producer price index for services (PRIS1515), which are both published by Statistics Denmark. They describe the development of prices of commodities and services between businesses, and for commodities produced in Denmark for domestic supply. For further information please refer to the relevant documentations of statistics.

The construction cost index is related to Producer price index for construction of dwellings (PRIS90), which is also published by Statistics Denmark. Producer price index for construction of dwellings describes the quarterly development in the price of a newly built one-family house, that is the price of purchase. The index is based on sales prices from housing companies. For further information please refer to the relevant documentations of statistics.

7.4 Coherence - internal

Not relevant for these statistics.

8 Accessibility and clarity

The statistics are published in *Nyt fra Danmarks Statistik* (News from Statistics Denmark) and in *Byggeri og boligforhold* (Construction and housing) which appears in *Konjunkturstatistik* (Main indicators).

Yearly publications: *Statistical Yearbook* and *Statistical ten-year review*

Statistics are available from Statbank Denmark at: (<http://www.Statbank.dk>): [Byg42](#) and [Byg52](#).

Furthermore, it is possible to subscribe to the construction index by postcards.

8.1 Release calendar

The publication date appears in the release calendar. The date is confirmed in the weeks before.

8.2 Release calendar access

The Release Calendar can be accessed on our English website: [Release Calendar](#).

8.3 User access

Statistics are always published at 8:00 a.m. at the day announced in the release calendar. No one outside of Statistics Denmark can access the statistics before they are published.

8.4 News release

[Danish news release](#) for construction cost index for residential buildings.

8.5 Publications

Publications only in Danish.

8.6 On-line database

The statistics are published in the StatBank in the following tables:

- [BYG42](#): Construction cost index for residential buildings by main index, sub index, kind, unit and time (quarterly)
- [BYG52](#): Construction cost index for residential buildings by main index, sub index, kind, unit and time (yearly)

Historical statistics can be found here: - [BYG4](#): Construction cost index for residential buildings by main index, sub index, kind, unit and time (quarterly, 1986Q4-2015Q4) - [BYG5](#): Construction cost index for residential buildings by main index, sub index, kind, unit and time (yearly, 1987-2015)

8.7 Micro-data access

Basis material is stored in a register. The system for calculating the indices is constructed so that it is possible to produce special indices. The basis in the system is the BC/SfB-Building Board, and within the framework of this Board there are vast opportunities of constructing special customised indices: Examples are:

- Index for a specific building part
- Index for one of the three buildings
- Index for other kinds of buildings, i.e. office buildings and universities

8.8 Other

The Construction Cost Index for Residential Buildings is transmitted to Eurostat on a quarterly basis in accordance with regulations 1165/98 and 588/2001.

8.9 Confidentiality - policy

All statistics in Statistics Denmark follow the data confidentiality protocol of Statistics Denmark. For the construction cost index for residential buildings only aggregated indices are published, thus discretion does not apply to this statistic.

8.10 Confidentiality - data treatment

All statistics in Statistics Denmark follow the data confidentiality protocol of Statistics Denmark. For the construction cost index for residential buildings only aggregated indices are published, thus discretion does not apply to this statistic.

8.11 Documentation on methodology

A further description of the method used is available in: The publication *Bygge- og anlægsvirksomhed* (Construction industry) which appears in the series *Statistiske Efterretninger* (Statistical News) no: 2003:33.

8.12 Quality documentation

Results from the quality evaluation of products and selected processes are available in detail for each statistics and in summary reports for the Working Group on Quality.

9 Contact

The administrative placement of this statistic is in the division of Prices and Consumption. The person responsible is Peter Fink-Jensen, tlf. +45 39 17 31 88, e-mail: pfj@dst.dk

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Statistics Denmark

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