STATISTICS DENMARK

Documentation of statistics for Producer price index for construction of dwellings 2023

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1 Introduction

Producer price index for construction of dwellings demonstrates trends in prices at the first stage of commercial transactions for the construction of free standing one-family houses, i.e. the producer price incl. direct construction costs and profits, but excl. VAT, cost of land and other costs not directly linked to the construction. The statistic is typically used in analyses of price developments in the construction sector. It has been compiled since 2019 with indices dating back to 2015.

2 Statistical presentation

The Producer Price Index for Construction of Dwellings is a quarterly measurement of price developments of commercial transactions related to the construction of new dwellings, i.e. the price a household or a developer pays the construction company for the construction of a dwelling. The statistic only covers construction of free standing one-family houses, and is therefore not representative of e.g. multi-family houses, terraced houses, general housing, vacation homes or commercial/industrial buildings.

2.1 Data description

The purpose of the Producer Price Index for Construction of Dwellings is to describe the price development of constructions of dwellings in Denmark. Currently, the statistic only covers free standing one-family houses. The price concept is the price of a newly built dwelling incl. the producer's direct constructions costs and profits, but excl. the cost of land, taxes and further costs not directly related to the construction of dwellings. Thus, the statistics contains information on producer prices for newly built dwellings in Denmark. The index is published quarterly and is based on prices reported by Danish type house entrepreneurs. Each publication includes a price index and the percentagewise price development since the last quarter.

2.2 Classification system

The statistic covers the construction of free standing one-family houses. A one-family house is defined by classification code 120 in the Danish Buildings and Dwellings Register (BBR). The classification describes the main use of a building. Thus, the index covers the production of dwellings carried out by companies that produce type houses belonging to code 41.20.00 (Construction of buildings) in the Danish Business Register.

2.3 Sector coverage

The statistic follows the construction of free standing one-family houses, and thus covers a part of the construction sector.

2.4 Statistical concepts and definitions

Hedonic regression: Methodology where the price of a good is modeled as a function of the characteristics of that same good.

Producer price: The price of a produced commodity incl. the producer's direct production costs and profits, but excl. VAT and additional costs not directly related to the production of the commodity.

2.5 Statistical unit

Prices.

2.6 Statistical population

The target population is all newly constructed dwellings in Denmark.

2.7 Reference area

Denmark.

2.8 Time coverage

2015-.

2.9 Base period

2015 = 100.

2.10 Unit of measure

Index and percentage changes.

2.11 Reference period

The statistics corresponds to the quarter. The indices are related to dwellings that have been completed within the relevant quarter.

2.12 Frequency of dissemination

Quarterly.

2.13 Legal acts and other agreements

The legal authority to collect data is provided by the Act on Statistics Denmark, section 8, as subsequently amended (most recently by Act no. 610 of 30 May 2018). The statistic is also included in the future framework for business statistics in the EU: FRIBS.

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2.14 Cost and burden

The response burden has not yet been calculated for this statistic. Data is reported by companies via a questionnaire, which is uploaded to https://virk.dk/. Statistics Denmark aim to minimize the response burden by making the reporting process as straight-forward and user friendly as possible. It is assumed that the reporting process takes less than one hour pr. quarter. In cases erroneous or missing data, Statistics Denmark first examine if such data can be acquired from the Danish Buildings and Dwellings Register (BBR). If not, Statistics Denmark may contact companies to correct the the erroneous data.

2.15 Comment

For more information please see the home page for construction sector indices or contact Statistics Denmark.

3 Statistical processing

Every quarter approximately 500-1200 prices are collected from a sample of relevant type house construction companies in Denmark. Prices are collected through an electronic reporting form via Business in Denmark. The collected prices are merged with relevant information from the Danish Buildings and Dwellings Register (BBR), such as total area, number of bath rooms and roofing material. The index is calculated by use of a hedonic regression where different information (characteristics of the single dwelling) is used.

3.1 Source data

The Producer Price Index for Construction of Dwellings is calculated on the basis of prices, reported by selected companies engaged in construction of one-family houses. The sample is selected using a top-down approach by turnover. The collected prices cover 30 to 40 pct. of completed free standing one-family houses i Denmark every quarter. Furthermore, the price information is enriched with information from the Danish Buildings and Dwellings Register. Currently, only data on free standing one-family houses are collected. This is due to the fact, that construction of one-family houses typically are carried out by just one entrepreneur with one final sales price. Construction of multi-storey buildings typically requires several entrepreneurs that may not have a final sales price for the whole building, which complicates the data collection process.

3.2 Frequency of data collection

Quarterly.

3.3 Data collection

The prices are collected though an electronic reporting form, which is sent to the relevant contact within the selected companies. All further information is gathered from the Danish Buildings and Dwellings Register.

3.4 Data validation

The first validation of the price data happens when prices arrive to Statistics Denmark. Here they are first tested for unusual observations and missing address information. The data is then merged with information from the Danish Buildings and Dwellings Register (BBR). Unmatched data is further examined manually for errors, and the missing information is attempted to be acquired from BBR. If necessary, reporting companies are asked to correct erroneous information. Also, prices in relation to size of dwellings are checked. The process of matching the reported data against BBR-data makes it relatively easy to detect errors, and thus include only relevant dwellings.

3.5 Data compilation

The Producer Price Index for Construction of Dwellings is compiled on the basis of prices for type houses as reported by entrepreneurs and information from the Danish Buildings and Dwellings Register (BBR). Every quarter prices of newly constructed free standing one-family houses, which were completed in the relevant quarter, are collected from a sample of selected type house companies. Prices are complemented by address information, which is used to add additional information on the building from BBR. Data that cannot be matched with BBR are manually checked for spelling errors, or by contact to the reporting company. Buildings with a different classification than a free standing one-family house are removed. The final data set is treated to hedonic regression, in order to calculate the price development in the relevant quarter compared to previous quarters. In hedonic regression the modelled price is a function of different characteristics of the house, such as area size, geography, number of rooms, number of bath rooms, roofing materials etc.

3.6 Adjustment

Besides data validation and data processing, no adjustments or corrections are made to the data.

4 Relevance

The Producer Price Index for Construction of Dwellings is a business cycle indicator, which is used in analyses of economic developments in Denmark. It is used in the Danish National Accounts, and is part of the framework of EU short term business statistics. Surveys of user satisfaction are not performed, but the statistics is part of Danish Statistics' expert committee for statistics on housing and civil engineering.

4.1 User Needs

The Producer Price Index for Construction of Dwellings is a business cycle indicator, which is used by in analyses of economic development in businesses and society as a whole. It is also part of Eurostat's common framework for business statistics. Furthermore, the index is used as a deflator in the Danish National Accounts for constant price calculations.

4.2 User Satisfaction

The Producer Price Index for Construction of Dwellings is part of the expert committee for statistics on housing and civil engineering, which is aimed at continuous improvement of this and other relevant statistics. No further surveys of user satisfaction are performed.

4.3 Data completeness rate

Ideally, the statistics reflects the development of producer prices of all newly constructed dwellings in Denmark. However, at this point, Statistics Denmark only has access to data for newly built free standing one-family houses. Thus, the construction of other types of dwelling, such as terraced houses, multi-storey apartment buildings or vacation houses are not included. Furthermore, all collected data originates from type house constructions, and the statistics is therefore not necessarily representative for construction of unique dwellings.

5 Accuracy and reliability

The statistic's accuracy is considered to be high, although a some possible sources of error exist. The collected price observations are examined for errors both manually and by computer. The extend of different error types is therefore considered to be negligible. As the collected data originates solely from typehouse companies, the statistic is considered to be more accurate for typical housing constructions and less so for unique constructions. Also, the used hedonic statistical model does not consider the quality of applied building materials or the quality of the work carried out.

5.1 Overall accuracy

The aim of the Producer Price Index for Construction of Dwellings is to illuminate the price development of newly constructed and sold free standing one-family houses incl. producer profits. The target population is therefore all newly constructed free standing one-family houses in Denmark. The index is considered to have a high overall accuracy, although some sources of error exist.

Sampling error: The sample consists of reported price observations by companies selected by a top-down principle, where companies with a high turnover are selected first, in order to achieve as high a market coverage as possible from as few participants as possible. The sample is therefore not a random sample and it is not possible to estimate the overall size of the sampling error.

Non-sampling error: In 2021 and 2022 the sample constituted about 40 pct. of all newly built one-family houses in Denmark, which is considered a satisfactory market share. Data is collected from a small number of typehouse companies, selected by a top-down principle according to company turnover. Therefore, coverage error may occur from the data basis not including unique housing constructions. Furthermore, the applied hedonic model is based on a number of building characteristics, such as information about area size, number of rooms, floors and toilets, and geography etc. However, the model does not consider the quality of applied building materials or the quality of the construction work. About 5-10 pct. of the collected data is removed, mainly due to errors in the reported price observations, which are identified by the manual and computerized troubleshooting. Such non response errors are considered to be random, as no systemic bias has been observed, and it is therefore not believed to significantly impact the accuracy of the statistic.

Overall, the statistic is considered to have a high accuracy compared to the actual price level of newly built one-family houses in Denmark; particularly for standard dwellings, but to a lesser degree for unique houses. It can be argued that unique housing typically has a higher sales price and may use more expensive building materials, and that the statistic therefore may underestimate actual price levels. However, this ascertion is not based on any empirical evidence.

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5.2 Sampling error

The sample is selected top-down to achieve as high turnover coverage as possible. The sample is therefore not a random sample and it is not possible to estimate the overall size of the sampling error.

5.3 Non-sampling error

Coverage error: The statistics is based on 30 to 40 percent of the completed one-family houses i Denmark, which is assessed to be a sufficient market coverage. The data sources are type house construction companies, which specialize in one-family housing, and in the statistic they therefore represent all newly built houses. The statistic therefore does not cover unique housing. It has not been possible to gather information on differences in characteristica between type houses and unique housing and it is therefore not possible to evaluate whether this coverage error leads to over- or underestimations of actual price levels. Data is collected from a small number of typehouse companies, selected by a top-down principle according to company turnover in order maximize coverage while minimizing the reporting burden. This may be a source of error, as prices and building methods may differ between major or minor companies. Coverage errors may in principle occur if type house companies mistakingly report prices of buildings other than free standing one-family houses, such as terraced houses or double houses. However, all collected data is coupled to register information from the BBR either manually or by machine, by which such errors are detected and removed, to ensure that only free standing one-family houses are included in the calculations. There may occur administrative errors in the Danish Buildings and Dwellings Register (BBR) but this is not considered to be a significant source of error.

Measurement errors: Reported prices may be erroneous, but this is not considered to be a significant source of error. All prices are examined manually for extreme values that may lead to exclusion of observations.

Unit non-response rate: About 5-10 % of reported prices are excluded. This is primarily due to reporting errors, such as incorrect building types or building periods, or non-identifiable buildings due to incorrect addresses. Also, a small number of observations may be excluded because building information have not been available in the BBR prior to publication of the index. No systematic bias has been observed amongst lapsed price observations, and it is therefore not considered a significant source of error.

Model assumption error: The price development is calculated using hedonic regression which implies some assumptions with regards to which characteristics influence the price of the construction of a one-family house. This model considers some but not all characteristica relevant to the price. The characteristics used in the calculation are the following: Floor area (residential, conservatory, basement, carport, attic and outhouse), roofing material, number of rooms, number of bathrooms, number of floors, geography, and the construction company involved. However, the model does not consider the quality of applied building materials or the quality of the construction work, as such information cannot be obtained from the administrative registers. This introduces risk of error, as a price development might be driven by changes in quality. However, it is expected that the quality of houses built in two consecutive quarters will have the same quality on average.

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

An overall quality assessment rests upon a combination of coverage, number reporting businesses and prices in the sample and he quality of the collected prices and the price methods used. The sample is selected in order to cover as large a share of the turnover in the industry as possible. Since the statistics was established in 2015, prices for 30 to 40 per cent of the completed one-family houses each year. The coverage varies according to the combined market share of the reporting companies that has been increasing throughout the time period. Prices are matched with information from the Buildings and Dwellings Register, e.g. floor area, number of bathrooms and roofing materials. This information is used in the calculation of the index using a hedonic regression - a method recommended by Eurostat for calculating price indices for heterogeneous products/services. The quality is monitored continuously and efforts are put in where the quality can be improved. The quality work e.g. consists of supplementing the sample.

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

No revision.

6 Timeliness and punctuality

These statistics are published quarterly, approx. 3-4 month after the end of the reference period.

6.1 Timeliness and time lag - final results

Production time is approx. 90-100 days. 3-4 month after the reference period the statistic is published.

6.2 Punctuality

No delays recorded.

7 Comparability

The statistic has a continuous time series from 2015 until present day. The statistic follows international standards and is therefore comparable with similar statistics from other countries.

7.1 Comparability - geographical

The statistic follows international standards and is therefore comparable with similar statistics from other countries.

7.2 Comparability over time

The statistic is comparable over time and has a continuous time series from 2015 and onwards.

7.3 Coherence - cross domain

Producer price index for construction of dwellings highlights the development of the total sales price, incl. producer profits, for construction of free standing one-family houses in Denmark. The statistic is related to the Construction cost index for residential buildings (BYG42), which however uses a different price concept: Total construction cost excl. profit and non-enterprise costs, such as law, administration, architect etc. Statistics Denmark also publish statistics on the number of newly constructed dwellings, numbers of house sales, building stock etc. Producer price index for construction of dwellings is used for deflation of the National Accounts and is reported to the Danish National Archives.

7.4 Coherence - internal

The index is produced used reported prices and connected addresses for newly constructed one-family houses. To ensure that only one-family houses is included in the calculation the reported addresses are merged with information from the administrative register on dwellings (BBR).

8 Accessibility and clarity

The statistic is published quarterly in the Statbank as Producer Price Index for Construction of Dwellings (PRIS90) and can be found at the subject page Indices for the construction sector. Once a year, in conjunction with the publication of 4th quarter indices (in April), the statistic is published in News from Statistics Denmark, which is available only in Danish under the title "Producentprisindeks for byggeri".

8.1 Release calendar

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

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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.

8.2 Release calendar access

The Release Calender can be accessed on our English website: Release Calender.

8.4 News release

Once a year (in April) this statistic is published in News from Statistics Denmark, which is only available in Danish language.

8.5 Publications

None.

8.6 On-line database

The statistic is published in the StatBank on the subject page Indices for the construction sector in the following table:

- PRIS90: Producer price index for construction of dwellings by type of dwelling, unit and time

8.7 Micro-data access

Access to Micro-data is not possible.

8.8 Other

None.

8.9 Confidentiality - policy

Statistics Denmark's data confidentiality policy stipulates the rules and procedures applied by Statistics Denmark when working with company data and information used in the production of statistics.

8.10 Confidentiality - data treatment

All data are handled confidentially. The Producer Price Index for Construction of Dwellings is published at such a high aggregation level, that discretion does not apply.

8.11 Documentation on methodology

There is no separate documentation on methodology for this statistics.

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 statistics are in the division of Prices and Consumption. The person responsible is Peter Fink-Jensen, tel. +45 21 34 76 92, e-mail: pfj@dst.dk

9.1 Contact organisation

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