STATISTICS DENMARK

Documentation of statistics for Construction Cost Indices for Civil Engineering Projects 2024

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1 Introduction

The Construction cost indices for civil engineering projects show the trends in prices for construction of civil engineering projects in Denmark. It is used, among other things, for regulation of building contracts, and for following the economic conjuncture in the construction industry. The statistics have been compiled in various forms since 1959, but in its current form the indices for earth work, asphalt work, concrete structures, and iron structures are comparable from 1976 and onwards. The index for roads is comparable from 1996 and onwards.

2 Statistical presentation

The Construction cost indices for civil engineering projects shows trends in prices for work performed by different contractors in civil engineering projects: Earth work, asphalt work, concrete structures, iron structures and sub-indices for traffic performance by lorries and materials and machinery. Trends in costs for construction of roads are also monitored based on a weighting of indices for earthwork, asphalt work and concrete structures.

2.1 Data description

The Construction cost indices for civil engineering projects is a quarterly statistic on those costs associated with civil engineering works. It is computed for Earth work, Asphalt work, Concrete structures, and Iron structures, as well as subindices for Traffic performance by lorries, and Materials and machinery. Moreover, an index for construction costs of roads is computed based on a weighting of indices for Earth work, Asphalt work, and Concrete structures. Furthermore and Operating index is computed from oil fuel, subindices for Traffic performance by lorries and Materials and machinery, as well as labor costs.

The overall costs for civil engineering projects covers the costs associated with the construction of the road network in Denmark. The cost index is a weighted index, which means that the index is calculated as a weighted average of the change in prices for materials and labor costs. The index illuminates exclusively the development of costs associated with civil engineering works, and, therefore, does not state anything about the actual level of the costs.

The index is calculated as a chained fixed weights Laspeyres index, and shows the quarterly change in costs of a fixed basket of commodities, which in the case of the cost index for civil engineering projects encompasses those materials and labor input of civil engineering works.

The basis for the weights for this statistics were developed in cooperation with the Danish Road Directorate, DSB and the Danish Construction Federation in 1976 based on an analysis of a ongoing and completed civil engineering project. Approximately every fifth year, the weights are evaluated. Construction cost indices for road work was published in the first quarter 1995, when it replaced the index for motor highways and main roads. From January 1st 2001 the title was altered: Construction cost indices for road work to the Construction cost indices for civil engineering.

The weighting scheme for the cost index for road construction is set up in cooperation with the Danish Road Directorate on the basis of an analysis of a range of finished road constructions. The indices for earth works, asphalt works and concrete structures are used directly in the calculation of the cost index for roads . The three indices have weights of 38 pct. for earth works, 41,5 pct. for asphalt works and 20,5 pct. for concrete structures.

All indices are published both excl. and incl. unemployment benefits.

Until April 2004 the price concept was the actual producer or import prices excl. VAT. Actual prices means that both general discounts and actual discounts are offset in the price.

Since April 2004 the import prices have been collected as purchasing prices and not sales prices as previously. Hereinafter, the price concept for imported goods are actual purchasing prices c.i.f. excl. all taxes and duties.

2.2 Classification system

The index is based on subgroups for earth work, asphalt work, concrete structures, iron structures, as well as sub-indices for traffic performance by lorries, and material and equipment. Moreover, an operating index and an index for construction of roads is published, the latter of which is composed of earth work, asphalt work and concrete structures.

2.3 Sector coverage

Civil engineering sector.

2.4 Statistical concepts and definitions

Material prices: The material prices are calculated on the basis of information gathered for the price index for domestic supply along with prices for traffic performance by lorries.

Until April 2004 the price concept was the actual producer or import prices excl. VAT. Actual prices means that both general discounts and actual discounts are offset in the price.

Since April 2004 the import prices have been collected as purchasing prices and not sales prices as previously. Hereinafter, the price concept for imported goods are actual purchasing prices c.i.f.* excl. all taxes and duties.

*Costs related to transportation and insurance of the transported goods (cost, insurance and freight).

Labor costs: The labor costs are calculated on the basis of the convention salary agreed upon by the Danish Construction Association and 3F (United Federation of Danish Workers) incl. social contributions. All indices are published both excl. and incl. unemployment benefits.

Weighting scheme for the cost index for road construction: The weighting scheme for the cost index for road construction is set up in cooperation with the Danish Road Directorate on the basis of an analysis of a range of finished road constructions. The indices for earth works, asphalt works and concrete structures are used directly in the calculation of the cost index for road construction. The three indices have weights of 38 pct. for earth works, 41,5 pct. for asphalt works and 20,5 pct. for concrete structures.

The weighting schemes for earth works, asphalt works, concrete structures and iron structures set up on the basis of analysis on finished an ongoing civil engineering projects after discussing the matter with the Danish Road Directorate, Danish Railways and the Danish Construction Association.

For all indices there are sub-indices for labor costs and a number of main cost components. These are not published but can be retrieved by contacting statistics Denmark.

Sub-indices for traffic performance by lorries is based on the price of a fixed service (Freight transport by road) as reported by selected transportation companies to Producer price index for Services (PRIS1515). The distribution of costs for this service is not known.

2.5 Statistical unit

Costs.

2.6 Statistical population

The population encompass prices on the material and labor costs required for civil engineering projects.

2.7 Reference area

Denmark.

2.8 Time coverage

1986-

2.9 Base period

2015=100

2.10 Unit of measure

Index numbers and percentage changes.

2.11 Reference period

The Construction cost indices for civil engineering projects is compiled quarterly, i.e. the relevant index number is representative for 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 most of the data are obtained from other statistics produced by Statistics Denmark.

For information about how the prices used in the Construction cost indices for civil engineering are reported, users are referred to the documentations of statistics for Producer and Import Price Index for Commodities and Producer Price Index for Services.

2.15 Comment

Further information on the cost index for civil engineering projects is available at the statistic's subject page or by contacting Statistics Denmark, Prices and Consumption.

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3 Statistical processing

The indices are calculated on the basis of information from the Price index for domestic supply, the Producer price index for services, and The Building and Construction Agreement.

For all indices, sub-indices for labor costs and main cost groups are calculated. These sub-indices are weighed together to form the main indices. The weights reflect the shares of labor costs, material costs and equipment costs of the total costs of performing civil-engineering projects. The weights are based on an analysis of actual, completed civil engineering projects.

3.1 Source data

The data used in Construction cost indices for civil engineering projects are mostly obtained from other statistics produced by Statistics Denmark.

Prices of materials and equipment are collected from the Price Index for Domestic Supply, which gathers prices from producers and importers on a monthly basis. For more information see the documentation of statistics for Producer and Import Price Index for Commodities. 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.

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.

Labor costs are calculated based on the collective agreements between the Danish Association of Builders (Dansk Byggeri) and the United Federation of Workers in Denmark (3F), as include wage rates and social costs.

All indices in the Construction cost indices for civil engineering projects are calculated for both with and without unemployment benefits.

The basis for the weights for earth work, asphalt work, concrete structures, and iron structures were developed in cooperation with the Danish Road Directorate, DSB and the Danish Construction Federation in 1976 based on an analysis of a ongoing and completed civil engineering project. The weights reflect the shares of labor costs, material costs and equipment costs of the total costs of performing civil-engineering projects. The weight basis is reevaluated approximately every 5 years, lastly in 2015, where the original weight basis was found to still be adequate.

The weighting scheme for the cost index for road construction is set up in cooperation with the Danish Road Directorate on the basis of an analysis of a range of finished road constructions. The indices for earth works, asphalt works and concrete structures are used directly in the calculation of the cost index for roads. The three indices have weights of 38 pct. for earth works, 41,5 pct. for asphalt works and 20,5 pct. for concrete structures.

3.2 Frequency of data collection

Primarily quarterly. In regards to product prices from the Price index for Domestic Supply, prices from the middle of the last month in the quarter are used as representation for the whole quarter. Some costs are gathered yearly, or in connecting with newly negotiated working agreements.

3.3 Data collection

For the Construction cost indices for civil engineering projects data that has already been gathered by other in Statistics Denmark is used. Products prices from the Price Index for Domestic Supply are reported digitally by select companies via http://www.Virk.dk. Furthermore, some prices are collected from the internet. Wage rates are gathered from collective agreements between the Danish Association of Builders (Dansk Byggeri) and the United Federation of Workers in Denmark (3F).

3.4 Data validation

Basic data is validated before use in the Construction cost index for civil engineering projects. Price developments are tested for unusual and/or extreme changes. Prices that do not pass fixed threshold values will be checked manually by the staff and accepted only if the companies 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 cost index for civil engineering projects is calculated following a hierarchical system where the collected prices are distributed into a number of product groups. These product groups are aggregated to "basic aggregate groups", which are used to calculate "basic prices". The developments between basic prices in subsequent time periods are used to calculate "basic indices", which is the most detailed index level. The basic indices are then used to calculate aggregated sub-indices using the Laspeyres type index formula. Finally, sub-indices are used to calculate main indices, which are the highest level in the index hierarchy.

For all indices, sub-indices for labor costs and a number of main cost groups are calculated. These sub-indices are weighed together to form the main indices. The process of weighing from individual prices through main indices is based on so-called classification codes and separate weights for each index type.

Main cost indices include Roads, Earth work, Asphalt work, Concrete structures, Iron structures, and Operating index. Sub-indices for Materials and machinery, and Traffic performance by lorries are also compiled.

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 sections for Data validation and Data compilation.

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4 Relevance

The purpose of the Construction cost indices for civil engineering projects is to reflect the development in the costs of civil-engineering projects. It is mainly used for regulation of building contracts. The indices are utilized primarily by construction organizations, contractors, building owners, craftsmen, lawyers and public authorities.

4.1 User Needs

The Construction cost indices for civil engineering projects has two primary purposes. The index is used for contract regulation and to follow the economic development in construction costs. The indices are used primarily by construction organizations, contractors, building owners, craftsmen, lawyers and public authorities.

4.2 User Satisfaction

No information on user satisfaction is collected.

4.3 Data completeness rate

Not relevant for these statistics.

5 Accuracy and reliability

Overall the statistics are assessed to be representative for the general trends in costs of civil engineering projects in Denmark. The weight basis is based on an analysis of actual civil engineering projects. Changes in the typical use of materials, unusual price developments etc. may therefore affect the index' accuracy. The weight basis was reevaluated in 2015, where it was deemed representative for typical civil engineering work.

For further information on the accuracy of collected prices see the documentation of statistics for the Producer and Import Price Index for Commodities.

5.1 Overall accuracy

The weight bases of the indices for earthwork, asphalt work, concrete structures, iron and steel structures are based on an analysis of actual completed and ongoing civil engineering projects. The weights were established in 1976 in agreement with the Danish Roads Directorate, State Railways and the Danish Association of Builders. The weight basis for the construction cost index for roads was prepared in 1995 in collaboration with the Danish Roads Directorate on the basis of an analysis of various completed motorway and highway projects. The weights express how large a share labor costs and different materials and services constitute of the total cost of carrying out civil engineering work. The index is therefore based on the assumption, that the chosen civil engineering projects are representative of actual civil engineering work. Therefore, in the case of significant changes to typical civil engineering work, the accuracy of the index could be affected. The weight basis is reevaluated approximately every 5 years, lastly in 2015, where the original weight basis was found to still be adequate.

The statistics are primarily compiled on the basis of data from the Price index for Domestic Supply and wage rates from collective agreements between the Danish Association of Builders and the United Federation of Workers in Denmark (3F). 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 actual civil engineering projects, using principles of importance and representation. It is therefore assumed that price developments of the collected sample prices are representative of price development in actual construction work. Users are referred to the documentation of statistics for the Producer and Import Price Index for Commodities.

5.2 Sampling error

Sample uncertainties are not calculated as data sources are not randomly selected.

The price index for domestic supply, from which most of the prices used in Construction cost indices for civil engineering projects are gathered, uses a top-down principle by which a minimum of 70 pct. of the Danish production and import is covered. The used samples are therefore considered to be representative of actual price developments. A source of error may be if prices of relevant goods that are not included in the index differ significantly from prices of included goods. For more information see the documentation of statistics for Producer and Import Price Index for Commodities.

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5.3 Non-sampling error

Product substitutions: The Construction cost indices for civil engineering projects is calculated as a Laspeyres-type index with a fixed basket of products. However, in real life companies may substitute what products they use, e.g. due to pricing differences for similar products, due to company preferences, or because of technological advances. This may lead to the index diverting from actual cost developments, as companies may substitute products with lower cost versions. To accommodate this, Statistics Denmark is in running contact with reporting companies. They are requested to review their reported suite of products every two years in order to assess if the products are still representative of general sales or import. Companies are then requested to replace outdated products.

Substitution of the products used in the index may lead to changes in product quality, which is addressed by continuous quality corrections. Newly added products are included in calculations after their prices are registered for two subsequent periods.

Reporting errors: Errors may occur during registration of prices by reporting companies, either because wrong prices are given for a products, or because prices are given for the wrong product. These errors are usually due to misunderstandings and are accommodated by running dialogue with reporting companies. Errors may also occur during registration of prices at Statistics Denmark. However, both manual and computerized inspections of such errors are performed, and is therefore not considered to be a significant source of error. Missing price reports are found to be less than 1 pct. per index period. Missing prices are mostly estimated by a continuation of the last reported price. In the case of essential products, prices may be imputed. In cases where the price is unchanged over a period of 13 months, the sources are contacted to investigate if their reporting is erroneous.

Index calculation: Calculation of the Construction cost indices for civil engineering projects is done by computer in a dedicated price index system. The likelihood of calculation errors is therefore inconsiderable.

The basis for the weights for earth work, asphalt work, concrete structures, and iron structures were developed in cooperation with the Danish Road Directorate, DSB and the Danish Construction Federation in 1976 based on an analysis of a ongoing and completed civil engineering project. The weights reflect the shares of labor costs, material costs and equipment costs of the total costs of performing civil-engineering projects. The statistics are considered representative of the actual cost development for typical civil engineering projects in Denmark. Thereby the indices may be less representative for projects that differ from typical civil engineering projects. Also, the representativeness of the indices may decline further from the weight reference period, or if there is a change in the involved goods. Therefore, the weight basis is reevaluated approximately every five years, lastly in 2015, where the original weight basis was found to still be adequate.

It is assumed that developments of the prices used in the Construction cost indices for civil engineering projects are accurate and representative of actual price developments for relevant product groups. The products used in the index have not been chosen specifically for use in the index, but it is assumed that these products are representative of materials used in the construction of civil engineering projects.

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 indices for civil engineering project is assessed to be of high quality and representative for the general trends in costs of civil engineering projects in Denmark. The index is based primarily on existing data that has already been checked for errors.

It is not possible to specify the total error related to the of the index. 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. Running dialogue is carried out with involved companies to prevent misunderstandings and reporting errors.

The indices are calculated in a dedicated, computerized price index system to prevent manual errors. Errors may occur during the price reporting process, either from involved data sources or by Statistics Denmark, but this is accommodated by continuous monitoring of prices.

In general, it is assessed that the error margin is highest at the most detailed, least aggregated index levels, and drops at less detailed, more aggregated levels. The on-going monitoring and improvement of the quality of both incoming data and the weight basis means that the Construction cost indices for civil engineering projects are assessed to be of high quality and representative of actual construction of civil engineering projects in Denmark. Weight bases are reevaluated approximately every five years to assess the actuality of the indices compared to actual civil engineering work.

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 figures are compiled. Revisions are not performed, unless errors are found in already published numbers.

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6 Timeliness and punctuality

The statistics are published quarterly at the beginning of March (4th quarter), June (1st quarter), September (2nd quarter) and December (3rd quarter). Yearly statistics (four quarter averages) are also published in connection with the 4th quarter publication. The statistics are usually published without delay in relation to the scheduled date.

6.1 Timeliness and time lag - final results

Quarterly statistics are published in the beginning of March, June, September and December, respectively. Yearly statistics are published in the beginning of March.

6.2 Punctuality

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

7 Comparability

The first cost index for road fund work was compiled for March 1959 and the index for motorway work was compiled for the first time for March 1967.

The indices have since then changes both weights and calculation method several times, thus they are not directly comparable over time when going back to 1959.

The Norwegian statistical agency /(Statistics Norway) produce a cost index for road construction which is comparable to the Danish indices.

7.1 Comparability - geographical

The Norwegian statistical agency (Statistics Norway) has since 1985 produced cost indices for road construction. The indices are based on input prices and measure the development of the factor prices in road construction. The price changes of material, labor, equipment and transportation are weighted together to form total indices. I.e. the Norwegian indices are calculated using the same method as for the Danish indices. Thus, the total indices calculated in the two countries are comparable.

7.2 Comparability over time

The first cost index for road fund work was compiled for March 1959 and the index for motorway work was compiled for the first time for March 1967 with March 1965 equal to 100.

In March 1971 when Statistics Denmark began to publish the road indices, the weighting of the indices was adjusted. Simultaneously, the year 1968 = 100.

The calculation of labor costs in the road indices was originally based on actual labor costs. In 1976 Statistics Denmark began to calculate construction cost indices using the collective wage rate agreements. The same year the weight basis for main indices Earth work, Asphalt work, Concrete structures, and Iron structures was established and published.

The cost index for roads was published for the first time in June 1996. The aim of the new index was to simplify the index-calculation, as the new index is in future to replace the two indices for motorways and highways. Part of this process of simplification is that the construction cost indices for earthwork, asphalt work and concrete structures are used directly in compiling the new index.

From 1 January 2001, the indices were renamed from Construction cost indices for road to Construction cost indices for civil engineering projects.

As of the 1st quarter of 2016 the base year has been changed to 2015 = 100.

7.3 Coherence - cross domain

Prices of materials and equipment are collected from the Price Index for Domestic Supply (PRIS1115), which gathers prices from producers and importers on a monthly basis. Price Index for Domestic Supply describes the development of product prices in business-to-business transactions for products produced in Denmark for the domestic market and exports, as well as for products imported to Denmark. For more information see the documentation of statistics for Producer and Import Price Index for Commodities.

Prices of transportation are collected quarterly from the Producer price index for services (PRIS1515), from which prices of Freight transport by road and removal services are used. For more information please refer to the documentation of statistics for the Producer price index for services.

7.4 Coherence - internal

Not relevant for these statistics.

8 Accessibility and clarity

The statistics appear in News from Statistics Denmark, in Prices and consumption, in Main Indicators.

Annual publications: Statistical Yearbook and Statistical Ten-Year Review.

- Quarterly - BYG61
- Yearly - BYG71
- Subject pages

8.1 Release calendar

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

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

Scheduled release may be found at Scheduled releases

8.5 Publications

Statistical Yearbook.

8.6 On-line database

The statistics are published in the StatBank under the subject Construction cost index for civil engineering projects in the following tables:

- BYG61: Construction cost indices for civil engineering projects by index type, unit and time
- BYG71: Construction cost indices for civil engineering projects by index type, unit and time

8.7 Micro-data access

The primary data are stored in registers. Special processing and linkages of the data are not possible.

8.8 Other

Not relevant for these statistics.

8.9 Confidentiality - policy

All statistics in Statistics Denmark follow the data confidentiality protocol of Statistics Denmark.

8.10 Confidentiality - data treatment

For the Construction Cost index for civil engineering projects only aggregated indices are published, thus discretion does not apply to this statistic.

8.11 Documentation on methodology

Not available in English. A Danish version may be found at Indeksberegninger i Danmarks Statistik.

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, tel. +45 3917 3188, e-mail: pfj@dst.dk

9.1 Contact organisation

Statistics Denmark

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