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Central
Statistics
Office

Standard Report on Methods and Quality for Wholesale Price Index

Standard Report
on
Methods and Quality
for
Wholesale Price Index

This documentation applies to the reporting period:
January 2015 to Present

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Table of Contents

1 Overview

2 General Information

- 2.1 Statistical Category
- 2.2 Area of Activity
- 2.3 Organisational Unit Responsible, Persons to Contact
- 2.4 Objectives and Purpose; History
- 2.5 Periodicity
- 2.6 Client
- 2.7 Users
- 2.8 Legal basis

3 Statistical Concepts, Methods

- 3.1 Subject of the Statistics
- 3.2 Units of Observation/Collection Units/Units of Presentation
- 3.3 Data Sources
- 3.4 Reporting Unit/Respondents
- 3.5 Type of Survey/Process
- 3.6 Characteristics of the Sample/Process
 - 3.6.1 Population and Sampling Frame
 - 3.6.2 Sampling Design
- 3.7 Survey Technique/Data Transfer
- 3.8 Questionnaire (including explanations)
- 3.9 Participation in the Survey
- 3.10 Characteristics of the Survey/Process and its Results
- 3.11 Classifications used
- 3.12 Regional Breakdown of Results

4 Production of the Statistics, Data Processing, Quality Assurance

- 4.1 Data Capture
- 4.2 Coding
- 4.3 Data Editing
- 4.4 Imputation (for Non-Response or Incomplete Data Sets)
- 4.5 Grossing and Weighting
- 4.6 Computation of Outputs, Estimation Methods Used
- 4.7 Other Quality Assurance Techniques Used

5 Quality

- 5.1 Relevance
- 5.2 Accuracy and Reliability
 - 5.2.1. Sampling Effects & Representativity
 - 5.2.2. Non-Sampling Effects
 - 5.2.2.1 Quality of the Data Sources used (other than survey register)
 - 5.2.2.2 Register Coverage
 - 5.2.2.3 Non-response (Unit and Item)
 - 5.2.2.4 Measurement Errors
 - 5.2.2.5 Processing Errors
 - 5.2.2.6 Model-related Effects
- 5.3 Timeliness and Punctuality
 - 5.3.1 Provisional Results
 - 5.3.2 Final Results
- 5.4 Coherence
- 5.5 Comparability
- 5.6 Accessibility and Clarity
 - 5.6.1 Assistance to Users, Special Analyses
 - 5.6.2 Revisions
 - 5.6.3 Publications
 - 5.6.3.1 Releases, Regular Publications
 - 5.6.3.2 Statistical Reports
 - 5.6.3.3 Internet
 - 5.6.4 Confidentiality

6 Additional documentation and publications

1 Overview

The Wholesale Price Index release which is produced on monthly basis by the C.S.O., contains 4 price indices:

- (a) Industrial producer price index
- (b) Wholesale price index for building and construction materials
- (c) Wholesale price index for capital goods price index
- (d) Wholesale price index for energy products

The industrial producer price index for a specific sector measures, in index form, changes in prices received by Irish manufacturers for goods fully or partially produced in Ireland and sold to the home and export markets by that sector. The other three wholesale price index series incorporate imported and home produced goods sold by manufacturers and wholesale outlets. All constituent series are compiled using a Laspeyres type index formula. Identical items are priced each month so that changes in the cost of this constant basket reflect pure price changes only. It is compiled and published on a monthly basis by the Central Statistics Office.

The price sought is the price invoiced to customers for an item on the 15th day of the month (i.e. mid-month) Price quotations are collected in a monthly postal inquiry. Each month approximately 7,000 price quotations provided by a panel of approximately 1,200 respondent firms.

The indices are used by economists and expert users to evaluate and analyse developing price trends and as an indication of inflationary processes in the overall economy. These indices are used within the CSO for deflation purposes (constant prices). The industrial producer price index is used by Eurostat as a measure of short and medium term economic activity of the individual Member States of the EU and of the Union as a whole. The indices are also used in contracts by the building and construction industry as a measure of allowable price increases or decreases over the term of these contracts (i.e. elements of a contract price can be linked to the relevant index within the WPI).

2 General Information

2.1 Statistical Category

Primary statistical survey

2.2 Area of Activity

Economy\Producer and Wholesale Prices

2.3 Organisational Unit Responsible, Persons to Contact

Directorate: Business Statistics

Division: Prices

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2.4 Objectives and Purpose; History

The purpose of the industrial producer index is to measure, in index form, changes in prices received by Irish manufacturers for goods fully or partially produced in Ireland and sold to the home and export markets by that sector. The other three wholesale price index series (building and construction materials, capital goods and energy products) incorporate both imported and home produced goods sold by manufacturers and wholesale outlets.

Since its introduction in 1938 the WPI has been updated a number of times:

(i) Index with base October 1938 as 100

The monthly General Wholesale Price Index was introduced in the Irish Trade Journal and Statistical Bulletin in June 1946 and was the first official index of wholesale prices compiled for the State. Weights for commodities were based on their exchange value (i.e. sales value) during 1936. Difficulties were experienced in establishing a base period due to abnormal production patterns during the 1939 to 1945 war years. Approximately 1,050 price quotations were

used in all. Data was collected for both home produced and imported goods and indices were classified by 9 commodity groups.

(ii) Index with base 1953 as 100

The second series was introduced in the March 1955 issue of the Trade Journal and Statistical Bulletin. It was compiled for each month beginning with January 1954. The weights were based on 1950 Census of Industrial Production, external trade and agriculture output data. Approximately 2,380 price quotations were collected in all and indices were calculated and published for 12 commodity groups. As opposed to the “exchange” principle previously used, an “Economic Flow” principle was then adopted in the development of weights and commodity groups. Under this system transactions between members of the same sector were ignored – i.e. only transactions external to the sector were used in the index calculation.

(iii) Index with base 1975 as 100

A major canvassing operation preceded the introduction of the third wholesale price index series which was introduced in the March 1978 issue of the Irish Statistical Bulletin. The number of price quotations had increased to 3,300 and the number of sectors for which indices were published was expanded from 12 to 24. A number of major changes were made to the structure of the index. The NACE¹ 70 classification system was adopted, and the main thrust of data collection was now the collection of output prices for Irish Manufacturers. The published data focused more on the “Output of Manufacturing Industry” as opposed to the General Wholesale Price Index (although this index was retained). New tables for Building and Construction Materials and Capital Goods Price Indices were introduced. Much of the formatting and methodology introduced in this series has been retained up to the current series.

(iv) Index with base 1985 as 100

The fourth series was introduced in September 1989. Weights for industrial producer price indices were based on 1985 Census of Industrial Production figures. Canvassing to improve coverage was again a major feature of the updating program and at this point in excess of 4,000 price quotations were being collected. The methodology and format of the 1975=100 series were retained. By this time a new table for Energy Products Purchased by Manufacturing Industry had been introduced.

(v) Index with base 1995 as 100

This series was introduced in March 2002 with the publication of the January 2002 index. This series incorporated a number of technical changes as well as an updating of weights, sample of companies surveyed and products priced. The coding for the producer price indices was updated from NACE 70 to NACE Rev.1 . The EU Prodcom coding system was introduced for commodity groupings. The weights were updated to 1995 levels from a number of sources, notably the 1995 Census of Industrial Production, 1995 Prodcom Inquiry and National Accounts data.

(vi) Index with base 2000 as 100

This series was introduced in March 2003 with the publication of the January 2003 index. This series incorporated a number of technical changes as well as an updating of weights, sample of companies surveyed and products priced. The coding for the producer price indices was updated from NACE Rev.1 to NACE Rev.1.1. The weights were updated to 2000 levels from a number of sources, notably the 2000 Census of Industrial Production, 2000 Prodcom Inquiry and National Accounts data.

(vii) Index with base 2005 as 100

This series was introduced in June 2010 with the publication of the April 2010 index. This series incorporated a number of technical changes as well as an updating of weights, sample of companies surveyed and products priced. The coding for the producer price indices was updated from NACE Rev.1.1 to NACE Rev.2. The weights were updated to 2005 levels from a number of sources, notably the 2005 Census of Industrial Production, 2005 Prodcom Inquiry and National Accounts data.

¹Statistical classification of economic activities in the European Community

(vii) Index with base 2010 as 100

This series was introduced in October 2013. It incorporated a number of technical changes as well as an updating of weights. The weights were updated to 2010 levels primarily from the 2010 Census of Industrial Production, 2010 Prodcom Inquiry and National Accounts Data.

The change in base year from 2005 to 2010 (particularly with reference to the Producer Price Index series in tables 1 and 2) is required under EU regulations governing short term statistics.

The WPI is currently at base year 2015 equals 100. This series was introduced in March 2018. It incorporated a number of technical changes as well as an updating of weights. The weights were updated to 2015 levels primarily from the 2015 Census of Industrial Production.

The change in base year from 2010 to 2015 (particularly with reference to the Producer Price Index series in tables 1 and 2) is required under EU regulations governing short term statistics.

2.5 Periodicity

The survey is carried out monthly.

2.6 Client

The WPI is a general national requirement and is required in order to comply with European Union short term statistics regulations.

2.7 Users

- Eurostat
- National Accounts Division, CSO.
- Monthly Industrial Production section, CSO.
- Agriculture Prices Section, CSO.
- Building and Construction Section, CSO.
- Researchers/Economists
- Government Departments and Agencies
- The General Public and Business
- Professional Bodies

2.8 Legal basis

The WPI is a statutory enquiry, collected under the Statistics (Producer Prices Survey) Order, 2019 (S.I. No. 566 of 2019) made under the Statistics Act, 1993. The survey is also conducted in compliance with Council Regulation (EC) No 1165/98 of 19 May 1998 concerning short-term statistics (Official Journal L 1 62, 05/06/1998) amended in 2005 by Regulation (EC) no 1158/2005 (Official Journal L191/1 , 22/07/2005).

3 Statistical Concepts, Methods

3.1 Subject of the Statistics

The principle subject area is the measurement of producer prices and wholesale prices for goods.

3.2 Units of Observation/Collection Units/Units of Presentation

The unit of observation for the WPI is the price received by Irish manufacturers and wholesale outlets for goods. Price quotations are collected in a monthly inquiry.

The units of collection are local units (The local unit being defined as an enterprise or part thereof (e.g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place. At or from this place economic activity is carried out for which - save for certain exceptions - one or more persons work (even if only part-time) for one and the same enterprise).

The results are presented in price index form.

3.3 Data Sources

The primary data source is micro-data (i.e. prices) collected from individual enterprises or local units. In addition, regulatory information is used for such items as wages and salaries in construction.

3.4 Reporting Unit/Respondents

The WPI's reporting units are Manufacturers and Wholesale Outlets with 3 or more persons employed.

3.5 Type of Survey/Process

The survey is a sample survey of enterprises. The survey is primarily a postal survey however data is also collected via:

- On-line facilities, e.g. e-forms,
- E-mail,
- Price lists and
- Telephone.

3.6 Characteristics of the Sample/Process

3.6.1 Population and Sampling Frame

The sample includes a large selection of local units from each NACE heading. The sample size of the four series are as follows:

- industrial producer price indices classified by NACE Rev 2 – sample size of approximately 1,000 local units;
- wholesale price indices for building and construction materials – sample size of approximately 250 local units;
- wholesale price indices for capital goods – sample size of approximately 50 local units;
- wholesale price indices for energy products purchased by manufacturing industry – sample size of approximately 10 local units in addition to data sourced from the Single Electricity Market Operator (SEMO).

The producer price index covers products that are fully or partially manufactured in Ireland and sold to the domestic and export market, while the three wholesale price series incorporate imported and home produced goods sold by both manufacturers and wholesale outlets. These are approximately 7,000 price quotations taken each month across 1,500 commodity groupings.

3.6.2 Sampling Design

All units with 3 persons employed or more are included in the population of reference. No adjustment is made for the excluded units.

3.7 Survey Technique/Data Transfer

Data is collected by postal questionnaire, email, price lists, telephone and electronic questionnaire.

3.8 Questionnaire (including explanations)

The Wholesale Price Index - Inquiry Form is used in the survey. It can be accessed via the following link;

<https://www.cso.ie/en/methods/surveyforms/wholesalepriceindex/>

3.9 Participation in the Survey

There is a statutory obligation to provide the required data for those enterprises selected in the sample. Non-response is routinely followed up.

3.10 Characteristics of the Survey/Process and its Results

Producer and Wholesale Prices are collected for the calculation of indices published in a monthly release. The Industrial Producer Price Index for a sector measures, in index form, changes in prices received by Irish manufacturers for goods fully or partially produced in Ireland and sold to the home and export markets by that sector.

The percentage contribution of each sector to the overall percentage change is also published.

The Wholesale Price Indices for Building and Construction Materials, Capital Goods Price Indices, and Wholesale Price Indices for Energy products incorporate imported and home produced goods sold by manufacturers and wholesale outlets.

All constituent series are compiled using a Laspeyres type index formula. Identical items are priced each month so that changes in the cost of this constant basket reflect price changes only. Monthly and annual percentage changes are published.

3.11 Classifications used

The classification used is NACE Rev 2.

3.12 Regional Breakdown of Results

None.

4 Production of the Statistics, Data Processing, Quality Assurance

4.1 Data Capture

Data capture is by means of optical character recognition (scanning) of form returned by enterprises and by direct data entry into the CSO's Data Management System (DMS).

4.2 Coding

Not applicable.

4.3 Data Editing

During data entry any data that shows a 3% increase/decrease is automatically flagged and the price checked to ensure the cause of the increase/decrease is correct. Any erroneous prices are corrected.

The indices are checked during the calculation procedure at various levels. Any price changes of more than 20% are verified with the relevant company. Also, where Nace indices change more than 1% in the month, the product groups and prices causing the change are identified and verification/reason for the change is sought from the relevant companies.

4.4 Imputation (for Non-Response or Incomplete Data Sets)

Generally, if no price update is received for a month, the unchanged price is used in the calculation of the index. Pricing procedures are strictly based on the principle that identical items must be priced by respondents on each occasion (i.e. matched basket approach). If discontinuities occur, such as an item becoming unavailable, respondents are asked to price a suitable replacement product. The relevant price is excluded from the index calculations until two consecutive monthly quotations are obtained for the substitute. Where replacement products are excluded from the month's calculations the price trend for all other products in that product group is taken as the price trend for the product excluded. Indirectly, by doing this, a valuation is put on any quality change. This is known as an indirect or implicit method of quality adjustment.

4.5 Grossing and Weighting

The three-digit NACE sectoral weights used in the Industrial Producer Price Index are based on gross output figures as reported in the 2015 Census of Industrial Production. Price indices are published for major three-digit NACE sectors or appropriate two-digit groupings. At the three-digit NACE level these sectoral indices approximate closely to price indices for the commodities characteristic of these sectors since the compilations are based on local units for price reporting and weighting purposes. It is possible to derive indices at higher levels from combinations of two- and three-digit NACE sector indices. In this way overall producer price indices are derived and published.

Price indices are calculated for all Building and Construction Materials combined and 11 separate categories of materials. Home produced and imported commodities are covered. The weightings have been updated based on a dedicated survey of all trades undertaken by the CSO in 1998. This survey requested a breakdown of materials used

by building, civil engineering and other trade firms. All firms with more than 20 employees and a sample of those with less than 20 employees were surveyed. The results have been cross-checked for consistency against Census of Building results regarding overall purchases of materials. For each of the commodity headings the monthly price relatives are derived as the simple arithmetic average of the monthly relatives for the constituent varieties surveyed. An average of these commodity price relatives is taken to provide the published price indices using the Laspeyres index.

In the case of the Capital Goods Indices a distinction is made between (i) Transportable capital goods and (ii) Building and construction. Indices for Transportable capital goods are separately presented for three sectors, namely Agriculture, Industry and all other activity. For the industrial sector, separate indices are also provided for private vehicles and commercial vehicles. Equivalent indices for other specific capital goods items cannot be satisfactorily compiled since they have a high import content and it is generally not possible to price a sufficient number of identical products on a regular basis because of the infrequent and unique nature of most transactions. The Building and construction capital index is derived by combining a special hourly wage rate index for employees in the building and construction sector with the price index for Building and construction materials.

The index for Energy Purchased by Manufacturing Industry is compiled using weights based on the costs of different types of fuels purchased by industrial establishments.

4.6 Computation of Outputs, Estimation Methods Used

The WPI system is compiled using a variant of the fixed weighted Laspeyres index formula. When weights are updated at any level, chain-linking is applied. The formula used is as follows:

$$\left(\frac{\sum Q_0 P_{m-1} \left(\frac{P_m}{P_{m-1}} \right)}{\sum Q_0 P_0} \times 100 \right) = \left(\frac{\sum V_{m-1} \left(\frac{P_m}{P_{m-1}} \right)}{\sum V_0} \times 100 \right)$$

where:

Q_0 and P_0 : the quantity and price respectively of a commodity in the base period;
 P_m : the price of the commodity in the current month;
 Σ : represents summation over all commodities.

In practice the method of compilation of the Indices means that base year commodity weights are progressively updated each month and the price indices are derived by dividing the aggregate current monthly value by the corresponding base year value. The calculations are done in a number of stages reflecting the weighting structure of the WPI;

- (i) Initially average monthly price relatives are determined in the case of each respondent for individual commodity groupings. These are based on price changes recorded for identical products from the previous month to the current month. If a respondent prices more than one commodity within a commodity group, then a weighted (if the information is available) or simple arithmetic average is taken of the monthly price relatives;
- (ii) The average price relatives of different respondents within a particular commodity group are averaged and then weighted according to the share of sales recorded by each respondent, to give a price relative for the commodity group;
- (iii) The price relatives for each commodity group within a sector are then used to update the previous month's value weights for those commodity groups;
- (iv) The monthly sectoral price index is compiled by summing these current monthly value weights over all the commodity groups within that sector and dividing by the sum of the previous monthly value weights for those commodity groupings;

- (v) The previous month's value weights for each sector are updated by the monthly sectoral price indices to obtain the current month's updated value for the sector. This value is divided by the corresponding base year value to get the base year index for the sector;
- (vi) Indices are compiled at higher levels by aggregating the relevant sectoral value weights and dividing by the sum of the corresponding base year value weights.

4.7 Other Quality Assurance Techniques Used

A canvass of companies is conducted periodically to increase overall coverage levels. Non respondents are routinely followed up.

5 Quality

5.1 Relevance

The indices are short term indicators used both nationally and by the EU.

5.2 Accuracy and Reliability

5.2.1. Sampling Effect & representivity

Information on standard errors is not calculated as part of the aggregation process. The survey is designed to ensure that companies responsible for 50% gross output of a Nace sector. However as this reflects output in the base year it may not necessarily represent 50% of gross output in current year.

5.2.2. Non-Sampling Effects

5.2.2.1 Quality of the Data Sources used (other than survey register)

Data is used for some articles such as wages which are based on regulatory agreements. This data may not reflect actual transactions.

5.2.2.2 Register Coverage

Overall target is to achieve greater than 50% coverage of the gross output of the Nace sector. Periodically, canvassing is used to ensure coverage and to keep the selection of products and companies up to date.

5.2.2.3 Non-response (Unit and Item)

Generally, if no price update is received for a month, the unchanged price is used in the calculation of the index.

5.2.2.4 Measurement Errors

An incorrect price may be keyed in error. A price increase/decrease of 3% or greater is flagged and checked with the company.

5.2.2.5 Processing Errors

Data capture errors of ><3% are identified and investigated. Data editing is done until all price changes are accounted for. If there are issues with the coding of a new commodity then the company is consulted.

5.2.2.6 Model-related Effects

The model assumes that where the price of a product is not obtained it remains unchanged. In the case of prices in a foreign currency denomination the price used in calculations is changed on the basis of change in exchange rates of the foreign currency. In some cases, even where market price remains the same, changes in currency exchange rates may result in actual price changes in the index.

Weighting is based on the weights that pertained in the base year so may have changed considerably since base year.

5.3 Timeliness and Punctuality

5.3.1 Provisional Results

Not produced.

5.3.2 Final Results

Timing of price observations: Monthly – for the 15th of each month. Publication of results is within one month and 15 days after the end of the reference period. The data is sent to Eurostat on the day of publication. Nationally the total for both the domestic and non-domestic markets are published combined. The EU is provided with an additional breakdown of the domestic and non-domestic markets and in the case of the non-domestic market a breakdown of eurozone/non-eurozone is also provided.

5.4 Coherence

Consistency checks are done on a regular basis with the most recent Prodcum results and Monthly Production results. Differences are verified and this can lead to improved quality. In certain instances comparison with other data sources such as Consumer Price Index and Trade are conducted.

5.5 Comparability

Similar indices are produced throughout the European Union but the underlying methodologies may differ.

5.6 Accessibility and Clarity

5.6.1 Assistance to Users, Special Analyses

A summary of the main findings is presented on the front page of the Wholesale Price Index release each month. Background notes on the indices are also included in each monthly release. The methodology of the current series is described in the February 2018 Wholesale Price Index: Introduction of Updated Series Base Year 2015=100.

Data is available from 1995 onwards on CSO's Database Direct at;

<http://www.cso.ie/shorturl.aspx/211>

5.6.2 Revisions

None

5.6.3 Publications

5.6.3.1 Releases, Regular Publications

Wholesale Price Index at:

<http://www.cso.ie/en/statistics/prices/>
(under Current Releases)

5.6.3.2 Statistical Reports

Statistical Yearbook

<http://www.cso.ie/en/statistics/statisticalyearbookofireland/>

Eurostat - Statistics Explained

http://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_Explained

IMF – Quarterly Certification of Metadata

<http://dsbb.imf.org/Pages/SDDS/DQAFBase.aspx?ctycode=IRL&catcode=PPI00>

5.6.3.3 Internet

CSO website;

<https://www.cso.ie/en/index.html>

Eurostat (in respect of Industrial Producer Price Indices);

<http://ec.europa.eu/eurostat/web/short-term-business-statistics/data/database>

5.6.4 Confidentiality

All information supplied to the CSO is treated as strictly confidential. The Statistics Act 1993 sets stringent confidentiality standards: information collected may be used only for statistical purposes, and no details that might be related to an identifiable person or business undertaking may be divulged to any other government department or body.

Confidential headings are aggregated with non-confidential headings to produce non-confidential aggregates.

6 Additional documentation and publications

Wholesale Price Index Introduction of Updated Series
Base Year 2015 = 100

https://www.cso.ie/en/media/csoie/releasespublications/documents/prices/2015/Wholesale_Prices_Introduction_to_Series_2015_=100.pdf