PRODUCER PRICE INDEXES IN INDUSTRY

Three Producer Price Indexes are calculated in NSI

- o Total producer price index
- o Producer price index on domestic market
- o Producer price index on non-domestic market

The basic concepts relating to export prices are the same as those applying to domestic prices e.g.: (1) Domestic and Non domestic prices are collected, compiled and published within the same deadlines; (2) Price indexes are calculated at fixed base year- indexes at different level of detail are calculated as weighted average though ascending weighing system, following the structure of Classification of Economic Activities (NACE.BG 2008); (3) Base year according to requirements of Regulation 1158/2005 and amending Regulation 1168/98, concerning short-term statistics is changed every 5 years, ending by '5' or '0'[1].

1. Purpose, nature and use

Producer Price Index (PPI) is one of the main short-term business indicators; it is regarded as one of the important measures of the economic situation in the Country. Indexes for particular economic activity measure the average change in the prices of industrial products, which are produced and sold by Bulgarian enterprises. This is done on the bases of constant sample of groups of products, produced by the activity and sold on the domestic market or directly exported on non-domestic market and that sample is representative for total industrial production.

The purpose of the monthly survey on prices, applied by Bulgarian producers is to be calculated price indexes at different levels of aggregation, defined by Classification of economic activities. In this way, a system of price indexes is build that serve the needs of aggregated information as well as the needs of more detailed information.

Producer price indexes have several main uses:
- As a main short-term business indicators that predict the tendencies in inflation rate; PPI can be considered as an early measure of the current inflation process in the economy;
- As a deflator for calculation the values at constant prices. Example for deflation in National accounts, or for deflation of industrial sales and then for compilation the industrial production index;
- As an impartial measure of prices for contractual purposes;
- As a short-term indicator required from different international organizations like Eurostat, International Monetary Fond, European Central Bank, that use PPI for international comparisons and economic supervision.

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[1] Since July 2024 Producer price indexes are calculated at 2021 as s base year. Historical data are recalculated at the 2021 as a base year and they can be downloaded from INFOSTAT information system.

2. Definitions and sources of information

For the purposes of the producer price survey the surveyed price is defined as net revenue received from particular enterprise, for particular product, sold in particular day of the month.

PPI do not measure the actual price levels, they are limited in measuring of the average price changes between two points of time.

Information for calculation of PPI is received on the bases of monthly surveys on producer prices of industrial products, sold on domestic market and on industrial products sold on non-domestic market. The aim of Producer price surveys is: (1) To be compared prices of specific products with equal quality in the two surveyed time periods; (2) In the case of quality change of the surveyed specific products this quality change to be taken into account.

3. Coverage and sampling technique

The PPI survey covers mining and quarrying, manufacturing, electricity, gas, steam and air conditioning supply and water supply.

Indexes are calculated by economic activities at division level (2-nd digit level of NACE.BG 2008), at section level, for Main Industrial Groupings (MIGs: Intermediate products, Investment products, Consumer durable products, Consumer non-durable products, Energy products) and for total 'Industry' level.

3.1. Producer Price Indexes on Domestic Market

The sampling method used in the PPI survey involves a three stage sampling process: first PRODCOM-2008 groups, second reporting units and then specific products (transactions) are sampled.

3.1.1. Sample of PRODCOM product groups and Sample of reporting units

On the base of the annual survey on production and sales of industrial products (PRODCOM) the sample of product groups is made. After that for each of the selected PRODCOM groups the reporting units for price survey are sampled. A probabilistic method - proportional to size is used to ensure sufficient coverage. Probability proportional to size techniques involves identifying a stratum that will be selected with certainty (i.e. probability = 1) and the remaining strata selected with probabilities based on their relative contribution to sales on domestic market. The number of the units selected in the sample depends on the degree of industrial concentration of the enterprises from each sampled PRODCOM group.

3.1.2. Sample of specific products (transactions)

For each enterprise with the corresponding PRODCOM group that was sampled for price survey, the Price index estimation is based on the sample of specific product (specifications). For each enterprise the selected PRODCOM product groups are desegregated into group of product that show equal price changes and from these groups representative specification (specific products) are selected. The selected specifications reflect in the best way the price changes of the whole group. At that stage of sampling so called 'purposive sampling' or 'expert choice' is applied. The experts from the selected enterprises choose the price quotations, in other words products with the highest sales

volume are selected and long presence on the market. The selected products (transactions) must have the following attributes:

- To be representative of the company's production in the relevant product groups selected in the sample;
- To be manufactured and sold within the country. The definition of Bulgarian manufacture is that the nature of the good must be changed in the country. As examples, assembly of imported parts within the country would be included, but not a simple repackaging of an imported goods.

3.2. Producer Price Indexes on Non-domestic Market

The sampling technique applied has two stages – sample of enterprises, and sample of representative products/transactions.

3.2.1. The sample of enterprises is made on the bases of annual information on receipts of export sales of industrial enterprises. Enterprises with significant amount of export sales are selected for price survey.

3.2.2. The basic concepts relating to determination of priced products relating to export prices are the same as those applying to domestic prices. There are some additional conceptual and practical issues to consider when addressing the prices on non-domestic market: Different currency; Country of destination; Terms of sales.

4. Calculation of Producer Price Indexes

4.1. Calculation of the producer price indexes on domestic and on non-domestic market

Producer price indexes are base weighted (Laspeyres) indexes - that is to say they are weighted according to the turnover in the base year, currently 2021. After specification's price collection from the enterprises, elementary indexes (price relatives) are calculated for each specification (price relative – specification price in the current month divided by average price of that specification in the base year). After that price relatives are weighted with turnover (on domestic or on non-domestic market) structure in the base year.

Producer price indexes at different levels of aggregation are calculated from successive aggregations in which each level of aggregation uses the arithmetic mean of indexes at the level below, duly weighted with sales structure in the base year following the structure of the NACE.BG 2008.

In the weighting system, there are two categories of weights, which depend on the level of aggregation:

- At group level – 3-th digit of NACE.BG 2008 indexes are calculated as price relatives are weighted with sales structure on domestic or on non-domestic market by PRODCOM groups. These weights are received from annual PRODCOM survey in the base year.
- Higher-level indexes are weighted with the structure of the turnover, derived from Structural Business Statistics in the base year.

4.1.1. Calculation of monthly base year price index (2021 =100)

4.1.1.1. Calculation of elementary indexes (price relatives) at representative product (specification) level. Elementary indexes are calculated as the price of the selected specific product in the current month is divided by its average price in the base year.

$$I_i^{t0} = \frac{p_i^t}{(\sum_{t(0)=1}^{12} p_i^{t(0)})/12}$$

where:

I_i^{t0} Elementary index of price change of the representative product 'i' in month 't'

p_i^t Current price of the representative product 'i' in month 't'

$(\sum_{t(0)=1}^{12} p_i^{t(0)})/12$ Average monthly price of the representative product 'i' in the base year

4.1.1.2. Index calculation at PRODCOM group level

$$I_H^{t0} = \frac{\sum_{i=1}^{k} I_K^{t0}}{K}$$

where:

H PRODCOM product position, that consist of 'K' representative products (i = 1........... k)

I_H^{t0} Price index for PRODCOM product position 'H'

I_K^{t0} Price indexes of the representative products from PRODCOM product position 'H'

4.1.1.3. Producer price indexes at 3-th digit level of NACE.BG 2008

$$I_L^{t0} = \frac{\sum (I_H^{t0} \cdot V_H^0)}{\sum V^{0H}}$$

where:

I_L^{t0} Price indexes at 3-th digit level of NACE.BG 2008

I_H^{t0} Price index for PRODCOM product position 'H'

V_H^0 Value of sales for PRODCOM product position 'H' in the base year

4.1.1.4. Producer price index calculation at higher levels of aggregation - 2-nd digit level of NACE.BG 2008, section level, Main industrial groupings and total Industry level.

Producer price index calculation at higher levels of aggregation is base weighted Laspeyres indexes that is to say they are weighted according to the turnover structure on the domestic and on non-domestic market in the base year.

$$I_P^{t0} = \sum (I_L^{t0} \cdot v_L^0)$$

where:

I_P^{t0} Producer price index in month 't'

I_L^{t0} Price index for group (division, section, sub section, industry-total)

v_L^0 Turnover structure in the base year at the relevant level of aggregation

4.2. Calculation of Total Producer Price Index

Total producer price index is calculated from Producer price index on domestic market and Producer price index on non-domestic market weighted with the turnover structure on domestic and on non-domestic market to the total value of turnover at each level of aggregation.

$$_T J_p^{t0} = \frac{_{DM} J_p^{t0} * v_{DM}^0 + {_{NDM}} J_p^{t0} * v_{NDM}^0}{v_{DM}^0 + v_{NDM}^0}$$

Where:

$_T J_p^{t0}$ Total producer price index

$_{DM} J_p^{t0}$ Producer price index on domestic market

$_{NDM} J_p^{t0}$ Producer price index on non-domestic market

v_{DM}^0 Turnover value on domestic market in the base year

v_{NDM}^0 Turnover value on non-domestic market in the base year

4.3. Calculation of base year price indexes for different periods of time

Indexes for different periods of time at 2021 as a base are calculated as a simple average of the monthly base year price indexes. For example the price index for the period from the beginning of the year is calculated as a sum of the monthly base year indexes from the beginning of the year divided by the number of the months within that period.

$$I_P^{I-T} = \frac{\sum_{t=1}^{n} I_P^t}{n}$$

where:

I_P^{I-T} Index for the period from the beginning of the year at 2021 as a base

I_P^t Price index for month 't'

n   Number of the months within the period

4.4. Calculation of the monthly indexes and indexes for periods at different index base

From calculated in such a way base year indexes might be calculated monthly indexes (example – index for the current month according to the previous month or to the corresponding month of the previous year) and indexes for periods of time (example – index for the period from the beginning of the year to the corresponding period of the previous year) at different index base.

$$I_{t/t-1} = \frac{I_t}{I_{t-1}} * 100 \; ; \qquad I_{t/t-12} = \frac{I_t}{I_{t-12}} * 100$$

where:

$I_{t/t-1}$ Index according to the previous month

$I_{t/t-12}$ Index according to the same month of the previous year

5. Replacement of representative products (Quality corrections)

In the producer price survey on domestic market as well as on non-domestic market, the appropriate techniques for quality corrections are applied and the prices are adjusted in the case of change of the quality of the surveyed specific products. It is very important to take account the changes in quality by means of price changes i.e. to take account price changes that are due to inflation but not these that are due to changes in the quality of the priced products. It is very important product with constant quantity to be priced every month, because if quality changes in products are not identified and isolated/removed from reported prices before being used as indicators of pure price change in the index, then the accuracy of the PPI will suffer and calculated PPIs will be significantly biased. In the case of quality changes of the surveyed products care is taken to ensure that only 'pure' price changes are recorded for PPI purposes. According to PPI methodology different methods for quality corrections in the case of quality changes are used. The replacement of specifications basely is made through the chain of elementary indexes (indexes at the specification level) of the old and of the replacement products.

6. Publicity and transparency

The PPI data is firstly released 30 days after the end of the reference month. The announcement includes the base year Producer price indexes as well as indexes according to the precious month and indexes according to the same month of the previous year (http://www.nsi.bg/en/node/6865).

Producer Price Indexes (total, on domestic market and on non-domestic market) time series at 2-nd digit and higher level of aggregation of NACE.BG-2008 are available on the website of NSI – in the on-line database INFOSTAT: https://infostat.nsi.bg/infostat/pages/module.jsf?x_2=188