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FOREWORD

The National Administrative Department of Statistics (DANE), a government agency, is responsible for coordinating and regulating the National Statistical System (SEN). Within the Statistical Planning and Harmonization project, it works for strengthening and consolidating the SEN. The following processes support this commitment: the production of strategic statistics; the generation, adaptation and dissemination of standards; the consolidation and harmonization of the statistical information and the coordination of instruments, actors, initiatives and products, all actions geared towards the improvement of the quality of strategic statistical information, its availability, timeliness and accessibility in order to respond to the increasing demand for such information.

Conscious of the need and obligation to offer the best possible products, DANE has developed a standard guide for the documentation of the methodologies of statistical operations so as to contribute to the visualization and understanding of the statistical process. Through this instrument, the organization produces methodological documents, for use by specialists and the general public. They present in a standard manner, the main technical characteristics of the processes of each research. They are complete, of easy reading, which allows its analysis, control and evaluation.

This series of documents, favors the transparency, confidence and credibility of the technical quality of the institution for a better understanding and use of the statistical information produced following the principles of coherence, comparability, integrity and quality.

INTRODUCTION

This document is a practical guide that compiles the required information to present the bases and methodologic structure of the Producer Price Index (PPI). The PPI measures the average monthly change of the prices of a representative basket of domestically produced goods.

The index is part of the set of tools for short term analysis, geared towards the detection of inflationary transmission channels, so as to facilitate the study of the behavior of the prices of products since their entrance in the commercialization channels.

The first works on the subject were carried out by the Banco de la República (Colombia's Central Bank) from 1948 with a general trade index that was shortly replaced by the Wholesale Price Index (IPM) and as of 1991 the Producer Price Index (PPI) was introduced. In 2007 DANE assumed the elaboration of the PPI with the institutional objective of keeping continuity in the series and simultaneously introducing several required complements and technical adjustments. In 2015, this research was redesigned and the last published data correspond to the most recent revision of the index.

DANE carries out regularly the revision of the PPI in order to incorporate operational and methodological improvements that allow the process of production of the index to be more complete, in agreement with the new developments of advanced statistical systems. In agreement with the international recommendations and standards, the PPI must be updated at least every ten years.

Herewith are presented the main elements of information contained in the methodologies and other documents concerning the Producer Price Index (PPI) project, following the System of Quality Management and of Documentation of Processes.

This document comprises two parts: the first one summarizes the background of this research and the second presents in detail the design of the statistical operation, emphasizing in the thematic aspects, the operative and systems organization, topics related to quality control and finalizes with the analysis and dissemination of results.

1. BACKGROUND

In 1948 the Banco de la República constructed the price index for trade in general. The initial geographical coverage of the index was limited to Bogotá and included a representative group of products of agriculture, forest, mining, manufacturing and power generation sectors. In 1951, following the recommendation of the United Nations (UN) this index was redesigned and denominated price index of general wholesale trade (IPM). This redesign included the coverage of other cities, the enlargement of the basket and the incorporation of the Standard International Trade Classification (SITC) of products. Later, in 1970 the International Monetary Fund proposed some recommendations and on this occasion the redesign consisted in increasing the number of cities observed as well as that of the basket of products. Additionally, the International Standard Industrial Classification (ISIC) and the Classification of Foreign Trade According to Use or Economic Purpose (CUODE) were introduced.

In 1990, the IPM was replaced by the Producer Price Index (PPI). This change was an answer to the fact that the simultaneous inclusion of producers and wholesale distributers in the universe of observation of the IPM brought about heterogeneity in the origin of the information and differences between the components of prices according to the level of commercialization of the product. The replacement implied additionally a change in the conceptual and practical base, since it allowed to introduce methodologic advances in the calculation of the index as well as the update of the basket of goods and of the system of weights.

In 1999 the PPI was redesigned with the purpose of constructing a family of indices that allowed to follow up the change in prices from the supply side. Information was extracted from the supply and use tables of the National Accounts, and intermediate demand was excluded so as to reflect closer the change in prices from producers to final consumers.

In 2007, DANE took over the elaboration of the PPI with the institutional objective of giving continuity to the series and incorporate technical improvements as required.

DANE took over the methodological design of this index, given its advantages in handling information, as for example: for guaranteeing the updating and extending the structure of weights, having the required infrastructure for collecting information on a large scale basis, having its own updated registers of businesses operating in the country with information on their location and levels of production, having its own group of data collectors and specialized technicians in sampling as well as the legal instruments to request information on prices from reporting enterprises.

The redesigned PPI was issued in 2015. It corresponds to the most recent revision of the index and includes:

- Publication of the Price Index of Domestically Produced Goods, referred to goods produced in the country irrespective of the place of consumption.

- Update of weights: The previous structure used a 2000 base and the new one a 2011 base.

- Use of the results of the Annual Manufacturing Survey (2012), Statistics of Foreign Trade, National Agricultural Survey (ENA), Information System of Prices of the Agricultural Sector.

- Update of the baskets for National, Exported and Imported products using as input the EAM and information on Foreign Trade for the 2009-2012 period and the corresponding commodity balances of the 2011 National Accounts.

- Use of the ISIC version 4 A.C (January 2012) and CPC version 2 (July 2013) classifications, updated and published by the Direction of Regulation, Planning, Standardization and Normalization (DIRPEN-DANE).

- Implementation of the new Oracle platform for the calculation of PPI.

- Adoption of an internationally accepted system of imputation, that allows to deal with the temporary lack of information from information sources.

- Indexation of Weights (2014).

Thus, DANE obtained a redesigned index that is adjusted to the present dynamics of prices of the productive sector of the country, with national coverage and based on the commodity balances of the Colombian national accounts.

The following table presents a summary of the historical evolution of the PPI.

Table 1. Historical evolution of the PPI

Event	Year	Index denomination	Geografic Coverage
Beginning with Banco de la República and IMF Agreement	1948	IPM- Wholesale Trade Price Index	Bogota
Redesign of the Index	1951	IPM of trade in general	Nine main cities
Second redesing of the index - Banco de la República	1970	IPM of trade in general	Fourteen main cities
Elaboration of the first Producer Price Index	1990	IPP Producer Price Index	National
Redesign of the Producer Price Index by Banco de la República	1999	IPP Producer Price Index	National
Redesign of the Producer Price Index by DANE	2007	IPP Producer Price Index	National

Source:Dane

2. DESIGN OF THE STATISTICAL OPERATION

2.1 METHODOLOGICAL THEMATIC DESIGN

2.1.1 Needs of information

The PPI arises from the need to have an index that reflects the behavior of the prices of products in the first stage of commercialization within the productive structure of the country, allowing the detection of inflationary transmission channels and the follow up of the changes in prices in the economic activities of the country.

2.1.2 Objectives

a. General objective

To provide a measurement of the average monthly change of the prices of a representative basket of domestically produced goods, including both goods produced for domestic consumption and goods to be exported.

b. Specific objectives

- The index should serve as a deflator of nominal values in the production account of the Colombian National Accounts (annual and quarterly), of the Annual Manufacturing Survey, and of the Monthly Manufacturing Survey, among others.

- To build an index on the change over time of the prices of domestically produced goods.

- To provide index numbers for technical exercises on deflation and indexing of monetary values related to domestic production.

2.1.3 Scope

At the moment, the research on Producer Price Index is limited to information related to goods. Services will be included in a next redesign.

With this research DANE provides the users with the information of the price index of the domestic production which includes goods produced in the country irrespective of the consumption place. Additionally, the following procedures were undertaken: the update of the baskets and fixed weights, the inclusion in the calculation of flexible weights, improvements in the imputation methods, update of classification and use of CPC ver. 2 A.C and ISIC ver. 4 A.C and the indexation of weights.

2.1.4 Reference framework

a. Theoretical framework

In general terms, the PPI of Colombia is defined as an index that measures the average change in the prices of a representative basket of domestically produced goods in the first stage of commercialization.

This index is part of a set of tools for the short term analysis; its main purpose is to detect inflationary transmission channels, so as to make possible the study of the behavior of the prices of products when entering into the commercialization channels.

From the microeconomic theory of the producer, mechanisms were developed attempting to empirically measure the producer prices of the goods and services generated by the productive units. Another reason for developing the PPI is the need to measure subjective and intangible variables of economic nature as is the setting up of a set of production possibilities.

The PPI is immersed within the microeconomic theory of the producer that supposes certain considerations on the economic reality. Some of those considerations taken into account in the model on which the PPI is based will be exposed below: the economy is closed, that is to say, there is no international trade; durable goods, capital assets or inventories do not exist either, so that the goods produced in a

certain period are consumed in this period; the technology is defined with non-increasing yields on scale[1]; externalities do not exist[2]; the price is considered to be formed in the marketplace so that producers and consumers are price takers. Finally, Government is supposed no to exist, therefore taxes do not exist nor public goods and national production is equal to the production by the private sector.

In theoretical terms, the producer has a production-possibility frontier that is a set of quantities that he can obtain given a production technology and some inputs, so that given the prices which the producer faces, and the existing technology and inputs, the producer can produce a combination of quantities of goods that generate the maximum benefit for him.

From these theoretical considerations, the inflation from the supply side may be measured assuming that the producer is a profit maximizer subject to a technological restriction.

Economic approach to the PPI

The IMF Manual on PPI[3], in its section on the economic approach to the PPI (Chapter 17), presents the theoretical mathematical development from which the index is derived and that is summarized as follows:

Taking into account the inputs, the prices, the technology and the combination of the quantities to be produced, it is possible to obtain the function of the revenue that the

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[1] This definition refers to the change in production as a result of a proportional change in all the inputs. If the production increases in the same proportion as the inputs, there are constant yields of scale; if the production increases in a proportion   lower than the proportion of increase of the inputs there are decreasing yields of scale and finally if the production increases more than the proportion mentioned there are increasing yields of scale.

[2] An externality appears when the cost or the profit derived from the production of a good or a service are not reflected in the market price of this product or service. Therefore, this activity may have an influence on others (positively or negatively), without paying for it (if the externality is positive) or being paid for (if the externality is negative).

[3] Producer Price Index Manual, theory and practice. IMF (2010). Washington D. C.

producer reaches in the period of time (t). This is represented with the following formula:

$$I^t\,(p,v)\ = \textstyle\sum_{n=1}^{N} p_n\, q_n \ (1)$$

In which

I^t = Corresponds to the revenue obtained by the producer in time t.

(p, v) = Corresponds to the prices (p) of the goods and (v) inputs used in production (v).

(q) = Corresponds to the amounts produced in period t.

(n) = Corresponds to the number of goods.

From equation (1), it is possible to define the price index of products P^t between two periods of time, namely t=0 and t=1, as:

$$P^t(p_0,p_1,v) = \frac{I^1\,(p_1,v)}{I^0(p_0,v)}\ (2)$$

Where P_0 and P_1 are the prices faced by the producer in periods t=0 and t=1 and v represents a set of inputs.

In this general case, the equation (2) is a relative of possible revenues that the producer could obtain given the technology and the set of consumptions v of period t. In this equation the numerator is the maximum benefit that the producer would obtain if it faces the prices P_1 and the denominator is the maximum benefit that he would obtain if he faces the prices P_0. In this way, there is a variety of indices according to the technology and inputs chosen.

Assuming that the establishment only produces a good (*N=1*), it is possible to demonstrate that the price index of products converges to the ratio of the prices of the unique product between both periods p_1^{1}/p_1^{0}.

Within the great variety of possible indices given in the equation (2), there are two special cases that give as result two theoretical indices of great relevance for the theory of indices:

a. A product price index that uses the technology of the base period, the inputs of the base period may be described as: $Index_0(p_0, p_1, v_0)$.

b. A product price index that uses de technology of period 1 (subsequent to the base period) and the inputs of period 1may be described as : $Index_1(p_0, p_1, v_1)$.

In practical terms, it is possible to get an approximation of these theoretical indices from the Laspeyres and Paasche indices. The Laspeyres index is the theoretical lower limit of the price index of products determined in literal (a) and the Paasche index is the theoretical upper limit of the price index of products determined in literal (b).

The calculation of the PPI is based on an index of fixed weights of a Laspeyres type that is obtained from:

$$Laspeyres\ price\ index = \frac{\sum p_1 q_0}{\sum p_0 q_0}$$

where fixed amounts are taken both for the current period and the base period (q_0) and the prices correspond to the base period (p_0) and to the current or later period, (p_1). This expression shows the relative change in the value of production of a basket of goods between two periods of time, keeping the amounts produced in the base period (q_0) constant. These amounts reflect the productive structure of the country in the period of reference.

 Despite the previous assertion, a **modified Laspeyres** formula is used. In this type of index, the price of the current period is compared directly with the price of the previous period and indirectly with the price of the base period to which the weights (quantities) correspond.

Some of the drawbacks of the traditional Laspeyres index are:

- In the economies that present very rapid changes the traditional Laspeyres index does not allow to reflect them.

- The traditional Laspeyres index compares relative prices of the current period with prices of the base period, which implies a comparison of changes in the prices over large periods of time for each item.

- It is not possible to find an easy way to compare the relative price of each item in the current period, with respect to the price of the period of reference, since the continuity of the specifications of the item is required over large periods of time.

- In the long run, the varieties of a product may completely disappear and there might not exist representative varieties that replace the old ones; this may lead to a situation where there is no price in the period of reference to be compared with that of the base period.

The following are some advantages of the modified Laspeyres index:

- For temporarily lost prices, imputed prices are used based on the change in the total price of the product group under study, it is possible that short term imputations be more reasonable than long term imputations.

- The use of the relative price with respect to the previous period is a solution for the new varieties that may be introduced as soon as two successive quotes of prices are available.

The formula of the modified Laspeyres index is obtained as follows:

$$I_{0 \to t} = \frac{\sum_{i=1}^{N} \left(\frac{P_i^t}{P_i^{t-1}} \right) * P_i^{t-1} q_i^0}{\sum_{i=1}^{N} P_i^0 q_i^0} * 100$$

$$p_{t-1,i} q_{0,i} = P_i^0 q_i^0 * \frac{P_i^1}{P^0} * \frac{P_i^2}{P^1} * \dots * \frac{P_i^{t-1}}{P^{t-2}}$$

$$I_{0 \to t} = \sum_{i=1}^{N} w_i^0 * \left(\frac{p_i^t}{p_i^{t-1}} \right) * \left(\frac{p_i^{t-1}}{p_i^0} \right)$$

$$I_{0 \to t} = \sum_{i=1}^{N} w_i^{t-1} * \left(\frac{p_i^t}{p_i^{t-1}} \right)$$

$$w_i^{t-1} = w_i^0 * \frac{p_i^{t-1}}{p_i^0}$$

b. Conceptual Framework

Index Number: value that shows the changes of a magnitude over time and throughout the space. The important characteristics in the construction of an index number are its coverage, base period, weighing system and the method of averaging observations.

Standard Laspeyres Price Index: it is a price index defined as a fixed weighted index or a fixed basket index as it uses the basket of goods and services of the base period. The base period serves as the reference period for the weights and the period as reference for the prices. In this case the price of the current period is directly compared with the price of the period on which the weights are based.

Modified Laspeyres Price Index: in this type of index, the price in the current period is compared directly with the price in the previous period and indirectly with the price in the period on which the weights are based.

c. Legal Framework

Decree 3167 of 1968, states explicitly that among other functions DANE must *"Establish price indexes at the level of producers, of distributors and of consumers, for the main goods and services, to elaborate them and periodically publish the summary of the obtained results".* (Chapter I, article 2, paragraph J)

d. International references

The international context of this research is defined by the international references that guarantee and allow the comparability between the different countries implementing PPI measurements. In the PPI redesign the following references were taken into account:

- International Monetary Fund (IMF)

- Organization for Economic Cooperation and Development (OECD).

- Recommendations of the Statistical Agency of Canada (STATCAN) through a technical assistance mission.

  "The International Monetary Fund (IMF) promotes the international financial stability and monetary cooperation. It also seeks to facilitate international trade, to promote high employment and sustainable economic growth, and to reduce poverty around the world"[4].

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[4] Information taken from: https://www.imf.org/external/np/exr/facts/spa/glances.htm

The document Producer Price Index Manual: Theory and Practice presents general recommendations for the elaboration and calculation of the PPI including:

- The international classifications to be used.

- The methodology and the procedures of calculation.

- The characteristics of prices to be collected.

- The treatment of quality changes.

- The substitution of items and the treatment of new products.

- The parameters of publication and dissemination.

On the other hand, the document *Producer Price Indices - Comparative Methodological Analysis,* presents a methodological comparison of the OECD countries regarding the problems that arise in the context of international comparisons of PPI concerning scope and coverage (type of prices been collected, classifications used, treatment of exports and weighing system). Additionally, it examines the basic data and their methods of collection (weighing and their sources, sampling methods), as well as the problems of compilation.

The *Data Quality Assessment Framework (DQAF) of the Producer Price Index (IMF)* was used as the base to guarantee the fulfillment of the international requirements associated with the quality and opportunity of this indicator and the application of the good practices in all the processes of this research.

Finally, the international technical assistance represented a mechanism to support the institutional work. The experiences of other countries in each processes of construction of the PPI, contributed in deepening more on the difficulties and in finding possible mechanisms to overcome them.

e. National References

The national references that support this research are: the methodology of the Consumer Price Index, published in August 2013[5], the methodology of the Producer Price Index of the Banco de la República published in June 1999[6] and the Manual of Good Practices for the Official Statistics published by DANE in 2015[7].

2.1.5 Design of indicators

a. Basic information for constructing the basket of product

The basket of product for the follow up of prices in the national market were obtained from the following sources: the Annual Manufacturing Survey (EAM), the National Accounts (NA) and the Foreign Trade statistics.

The EAM provided basic information of the industrial sector that help to understand its structure and evolution. This information was used to select the industrial products that are characteristic of the productive sectors of the country. The reports on raw materials and production were used to identify products and the subsectors for which the follow up is required.

The supply and use tables of the National Accounts were used to determine the sectors, other than the industrial one, that were relevant in domestic production. These sectors correspond to: agriculture, fishing, forestry and mining. They were determined using the ten digit codes of the National Accounts and their correspondence with the Central Product Classification (CPC).

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[5] http://www.dane.gov.co/files/investigaciones/fichas/Met_IPC_Ago13_11_14.pdf

[6] http://www.banrep.gov.co/es/node/16564

[7] http://www.dane.gov.co/files/sen/bp/Codigo_nal_buenas_practicas.pdf

The Foreign Trade statistics were used to identify the imports and exports that were significant for the national economy. The information was broken down by tariff subheading and once identified those that represented the most traded products, their correspondence with the CPC classification was sought in order to guarantee a unique system of classification.

b. Criteria for the selection of the basket of products

Within the PPI the products to be included in the basket for the follow-up prices, were selected by applying general and particular criteria. The general criteria used were:

- The products must present specific features that make it possible to identify them throughout the time in a clear) (objective) way.

- The products must offer guarantee of permanence in the time.

- The products must be produced or commercialized within the national territory by a legally constituted informant source, in which the commercialized products make reference to imported and/or exported goods.

The particular criteria correspond to: frequency of production or commercialization; share in the domestic production or foreign trade, and expectations of growth in the production or commercialization.

- Frequency of production or commercialization

  It makes reference to a horizontal analysis of a product or family of product by subsectors during a given period of time. This analysis verifies the continuity of their production or commercialization and thus determines the inclusion in the basket for the follow-up of prices. For the agriculture, forestry, fishing and mining sectors the information provided by the National Accounts is used.

In the industrial sector the information reported in the EAM is taken with the purpose of including in the basket those products that are constantly found in a certain time interval.

Regarding the Foreign Trade statistics, the monthly administrative records are examined and the frequency of appearance (commercialization) of each of the tariff subheadings and CPC subclasses within this period is analyzed. Ranks of permanence in this records are established; on which basis, the inclusion (or exclusion) of the product in the basket is determined.

The following table presents an example illustrating the methodology of inclusion for exported products as well as for each of the ranks of permanence and illustrates as an example of the CPC class that complies with the parameters.

Table 2. Methodology of inclusion for exported products according to frequency

Rank (months)	Procedure	Example	
		CPC	Description
61-72	Include in the basket	01962	Flowers and cut buds
49-60	Include in the basket Study behavior last months of the series	41320	Rough gold, semi-elaborated or in powder and its alloys
47-48	Analysis for possible inclusion	02111	Live bovines
01-36	Exclude from the basket	27220	Rugs and carpets

Source: DANE

▪ *Participation in domestic production or foreign trade*

This type of analysis of participation by sectors or vertical analysis, tries to guarantee that the products selected in the basket for the follow-up of prices significantly represent their respective activities or economic sectors. This type of analysis aims at complementing the study of the historical behavior of products and include those that are not produced and commercialized on a frequent base but have significant transaction values.

In the vertical analysis the products that have been selected for the basket should represent at least 80% of the value for each subsector:

▪ In the industrial sector, the information of the EAM was used to select the products that participate with a minimum of 80% of the value of production by each ISIC class (4 digits).

▪ In the foreign trade sector the minimum target of representativeness was 70% by ISIC class (4 digits) of all the activities that have participation both in import and exports, according to the information from Foreign Trade statistics.

▪ *Expectations of growth in the production or commercialization*

This criterion of selection is used to include within the basket, products that might not have been selected using the previous criteria. For such purpose, it is necessary to study the behavior of products by economic sectors that show expectations of increase in the levels of production and commercialization.

c. Structure of the basket

The basket for the follow-up of prices of the PPI has a matrix structure, where one of the dimensions corresponds to the different origins of products (produced for domestic consumption, imported and exported). The other dimension corresponds to the different sectors that comprise the totality of the productive activity of goods in the economy of the country (agriculture, cattle farming, forestry, fishing, mining and

industry). The following table shows the general structure of the basket for the calculation and publication of results of the PPI.

Table 3. Basket Structure for PPI

ECONOMIC SECTORS (Description)	Price Index calculation for domestic production		Price Index calculation for internal supply	
	Produced for Internal Consumption	Exported	Produced for Internal Consumption	Imported
Agriculture, Cattle Farming,Hunting, Forestry, Fishing	X_1	Y_1	Z_1	W_1
Mining	X_2	Y_2	Z_2	W_2
Manufacturing	X_3	Y_3	Z_3	W_3

Source: DANE

In the matrix, the products within the different economic sectors are organized according to a system of classification or structure of construction, in such a way that each product occupies only one place. Additionally, it allows that each level be constructed by aggregation of lower levels until arriving at the national total, as is indicated next:

- Subclass CPC (five digits)

- Class ISIC (four digits)

- Group ISIC (three digits)

- Division ISIC (two digits)

- Section ISIC (one digit)

- **National total**

The following table presents the number of subclasses that comprise the basket of prices for the Price Index of Domestic production.

Table 4. Composition of the basket of the Price Index of Domestic production.

DOMESTIC PRODUCTION		
Section	Descripton	Number of CPC Subclasses
A	Agriculture, cattle farming, hunting, forestry and fishing	34
B	Mining	8
C	Manufacturing	253

Source DANE.

d. Weighting system

The design of the calculation implemented by DANE for PPI follows the pattern introduced for the methodological improvements in the calculation of the CPI of 1998 and adopted by the Banco de la República for the design of the PPI of 1999. This development consists in using two structures in the calculation of the index: one fixed and the other one flexible.

The fixed structure works within the traditional framework of Laspeyres type indices, associated with a fixed weighting system. This part includes: indices at the level of CPC subclass; indices for classes, groups, divisions and sections of ISIC and the total index. In order to calculate the system of required weights, the supply and use tables for goods in year 2011 provided by the National Accounts were analyzed. From those tables were excluded: the illegal activities, the intra-consumptions and the nonmarket activities.

The flexible structure can be modified according to the permanent economic analysis realized on the information, so that it updates the price observations through its inclusion, exclusion or replacement. This structure is made of the products that belong to a given CPC subclass. These products include different varieties from which

price observations are obtained, so that it reduces the measurement biases that are naturally introduced when a fixed basket is used and long periods of time are taken before updating.

Flexible weights are applied at the level of articles -lower than that of CPC subclass-. These weights vary overtime due to the change in the dynamics of the sectors associated with the PPI that is reflected in the changes of information provided by the primary sources.

Flexible weights for national goods of the industrial sector were obtained from EAM 2012; for the farming goods, forestry and fishing sectors, information was taken from ENNA 2012 and SIPSA 2013 and finally for the imported and exported goods the figures were taken from Foreign Trade statistics for 2012.

e. Calculation of the PPI

The calculation of the PPI is performed in two stages. In the first stage the elementary aggregates are constructed and in the second, the calculation of indices of superior level is engaged, previous conversion of the foreign currencies into Colombian pesos[8].

First stage

Step 1: *Conversion of foreign currencies into Colombian pesos*

When the sources report prices in a currency different from the official one, the monthly average of the currency is used for the conversion of the value into pesos. This information is published by the Banco de la República and it is constructed taking only the work days of the month.

The procedure of calculation is explained step by step as follows:

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[8] The elementary aggregate corresponds to the lowest aggregation level in which the prices are combined.

Step 2. *Calculation of the relative indicator by quotes, informant sources, items and references*

The calculation of the relative r is done, for each quote i of item j of source f, from the collected information of each quote in period t and period t-1. The formula used is the following:

$$r_{j,f\,t}^{i} = \frac{p_{j,f\,t}^{i}}{p_{j,f\,t-1}^{i}}$$

Step 3. *Calculation of relative average by source, item and reference*

The geometric average of rc of all the references z of the same item j for each source f is calculated to obtain a unique relative by source and item. In this case the following formula is used:

$$rc_{j,fz_t} = \sqrt[N]{\prod_{Z=1}^{N}(r_{j,f_t}^{z}}$$

Step 4. *Calculation of the relative average by source and item*

The unweighted geometric average rc of the relatives obtained in the previous step corresponding to article j of source f is calculated. In this case, the following formula is used:

$$rc_{j,f_t} = \sqrt[N]{\prod_{i=1}^{N}(r_{j,f_t}^i}$$

Step 5. *Calculation of the weighted relative average by item*

The relative weighted arithmetic average rcw, of all the relative $rcj_{,ft}$ calculated in the previous step corresponding to item j. In this case, the following formula is used:

$$rcw_t = \frac{\sum_{j=1}^{n}(w_j * (rc_{j,f_t}))}{\sum_{j=1}^{n} w_j}$$

Where Wj is the weight at the item level. It there is not weighing, an unweighted arithmetic average is taken.

***Step 6**. Calculation of the elementary index by CPC subclass*

For the calculation of the elementary index of subclass k (CPC), the relative arithmetic averages calculated in the previous step are used, that are multiplied by the index obtained in period t - 1.

$$I_t^{subclass\ k} = I_{t-1}^{subclass\ k} * rcw_t$$

Where:

$$I_{december\ 2014}^{subclass\ k} = 100$$

In the base period there is not index $_{t-1}$ therefore, the relative rcw_t is multiplied by 100.

Second stage

When the first index of the fixed basket is obtained from the information of the flexible basket, the calculation procedure is limited to using aggregates of indices of the level immediately below according to the used classification, that is to say, ISIC Rev. 4 A.C. In the first place the calculation for each origin is realized (produced for domestic consumption, imported and exported) from which the combinations that give as result the different indices are obtained.

In the following, the procedure of the calculation is explained step by step:

Step 1. Calculation of the index of class l

This is done using an arithmetic average of the given indices of the Subclasses k that belong to Class l:

$$I_t^{Class\ l} = \sum_{\forall\ subclass\ k \in l} I_t^k * w_0^k$$

Where $W_0{}^k$ is the weight corresponding to subclass k of the CPC the version 2 A.C.

Step 2. Calculation of the index of group m

The weighted arithmetic average of the indices of Class l that belong to Group m is calculated as follows.

$$I_t^{Group\ m} = \sum_{\forall Class\ l \ni m} I_t^l * w_0^l$$

Where $W_0{}^l$ is the weight corresponding to class l in ISIC version 4 A.C.

Step 3. Calculation of the index of division p

Using the indices of the level of group m, a weighted arithmetic average of division p is calculated as follows:

$$I_t^{Division\ p} = \sum_{\forall Group\ m \in p} I_t^m * w_0^m$$

Where $w_0{}^m$ is the weight corresponding to group m in ISIC version 4 A.C.

Step 4. Calculation of the index of section q

Finally, the index of section q is obtained using a weighted arithmetic average of the indices of the level of division p according to the following formula:

$$I_t^{Division\ p} = \sum_{\forall Group\ m\ \in p} I_t^m * w_0^m$$

Where $w_0{}^p$ is the weight corresponding to division p in ISIC version 4 A.C

Step 5. Calculation of the total index

For this calculation, a weighted arithmetic average with the sections covered by the respective index is used. It is obtained from the application of the following formula:

$$I_t^{Total} = \sum_{\forall Section\ q \in Total} I_t^q * w_0^q$$

Where w_0^q is the weight corresponding to section q. This weight represents the participation of the value of production in each of the economic sectors in the total economy in the base period.

$$\sum_{\forall q \in T} w_0^q = \sum_{\forall q \in T} \frac{VP_0^q}{VP_0^T} = 1$$

VP_0^q: *Value of production in the base period for hierarchic group q (level below the Total).*

VP_0^T: *Total value of the production in the base period T (level above q).*

As it is observed in all the schemes, the weights applied in calculation of the index remains the same for all the periods; this is due to the use of the Laspeyres method. Nevertheless, each level in the hierarchic scale presents a different weight. This is because each weight represents the importance of a product within a subclass; of a subclass within each class; a class within each group; a group within each division; a division within each section and a section within the total index.

Secondary indices

Additional to the PPI, DANE offers to the users a family of indices allowing the identification of different sources of inflationary pressures. The following paragraphs describe the calculated and published indices classified by origin and by combinations of the different economic uses. Their breakdown is performed as follows a:

- <u>Domestic Supply Price Index</u>:

$$OI = PyC + M$$

$$OI = CI + CF + BK + MC$$

Where:

PyC= Goods produced for domestic consumption

M=   Imported Goods

CI= Intermediate Consumption Goods from internal supply

CF= Final Consumption Goods from internal supply

BK= Goods for capital formation from internal supply

MC= Construction Materials from internal supply

- <u>Price index of goods produced for domestic consumption</u>:

$$PyC = CI + CF + BK + MC$$

Where:

PyC= Goods produced for domestic consumption

CI= Intermediate Consumption Goods produced for domestic consumption

CF=Final Consumption Goods produced for domestic consumption

BK=Capital Formation Goods produced for domestic consumption

MC=Construction Materials produced for domestic consumption

- Price index of imported goods:

$$M = CI + CF + BK + MC$$

Where:

M=Imported goods

CI= Imported intermediate consumption goods

CF= Imported final consumption goods

BK= Imported capital formation goods

MC=Imported construction materials

- Price index of exported goods:

$$X = \text{Exported Goods}$$

The exported goods are not classified according to use or economic purpose (CUODE). As they are used abroad its use or economic purpose is not known.

- Price index of domestically consumed final goods:

$$BFOI = BKPYC + CFPYC + MCPYC + BKM + CFM + MCM$$

Where:

BFOI= Domestically consumed final goods

BKPYC= Domestically produced Capital goods

CFPYC= Domestically produced Final Consumption goods

MCPYC= Domestically produced Construction materials

BKM=Imported capital goods

CFM=Imported final consumption goods

MCM=Imported construction materials

- **Price index of domestically produced final goods for domestic consumption**: This index is one element of final demand.

$$BFPYC = BKPYC + CFPYC + MCPYC$$

Where:

BFPYC= Domestically produced final goods

BKPYC= Domestically produced Capital goods

CFPYC= Domestically produced Final consumption goods

MCPYC= Domestically produced Construction Materials

- **Price index of imported final goods**:

$$BFM = BKM + CFM + MCM$$

Where:

BFM= Imported final goods

BKM= Imported capital goods

CFM= Imported final consumption goods

MCM=Imported construction materials

All the final goods exclude intermediate consumption goods.

- <u>Price index of final demand</u>:

$$DF = BFPYC + X$$

$$DF = BKPYC + CFPYC + MCPYC + X$$

Where:

BKPYC= Capital goods produced for domestic consumption

CFPYC= Final Consumption goods produced for domestic consumption

MCPYC=Construction Materials produced for domestic consumption

X=Exports

Price index according to use or economic purpose - CUODE

- Price index of intermediate consumption goods

$$CI = CIPYC + CIM$$

Where:

CIPYC = Domestically produced Intermediate Consumption goods

CIM = Imported Intermediate Consumption goods

- Price index of final consumer goods (CF)

$$CF = CFPYC + CFM$$

Where:

CFPYC = Domestically produced Final Consumption goods for Domestic consumption

CFM = Imported Final Consumption goods

- Price index of the capital assets (BK)

$$BK = BKPYC + BKM$$

Where:

BKPYC = Domestically produced capital goods for domestic consumption

BKM = Imported capital goods

- Price index of construction materials (MC)

$$MC = MCPYC + MCM$$

Where:

MCPYC = Domestically produced Construction materials for Domestic consumption

MCM = Imported Construction materials

f. Published indicators

- **Index**

It is the variable that shows the changes in value of a basket of goods through time, taking a base period t_0 and maintaining constant the quality and the quantity of the goods.

Base period of the index (t_0) = December 2014   Base value of the index =100.

- **Chained Index**

It is a series of index numbers for an aggregate corresponding to a long period. It is obtained using the association of index numbers covering shorter periods, each with its own weighing system. The chain linking may be done according to the change of weights frequency, as long as the data allow it or in specific intervals from 5 to 10 periods. Weights may be changed every period; each element of the chain is an index that compares a period with the previous one.

- **Index of Jevons**

It is defined as unweighted geometrical mean of price relatives

$$P_j^{0 \to t} = \prod \left(\frac{P_i^t}{P_i^0} \right)^{1/n} = \frac{\prod (P_i^t)^{1/n}}{\prod (P_i^0)^{1/n}}$$

- **Change**

It shows the **percentage change** of the index in a period of time with respect to another. At present, when publications are made they include three changes: monthly change, change in the current year and change in the last twelve months.

Monthly change: it corresponds to the relation of the index in the month of reference with the index of the previous month less 1, times 100.

$$VM = \left(\left(\frac{Index\ for\ the\ month\ of\ reference}{Index\ for\ the\ previous\ month} \right) - 1 \right) * 100$$

Change in current year: it corresponds to the relation of the index in the month of reference with the index of the month of December of the previous year less 1, times 100.

$$VAC = \left(\left(\frac{Index\ for\ the\ month\ of\ reference}{Index\ for\ December\ of\ the\ previous\ year} \right) - 1 \right) * 100$$

Change in the last twelve months: it corresponds to the relation of the index in the month of reference with the index of the same month of the previous year less 1, times 100.

$$V12M = \left(\left(\frac{Index \ for \ the \ month \ of \ referencee}{Index \ for \ the \ same \ month \ of \ the \ previous \ year}\right) - 1\right) * 100$$

- **Contribution**

It allows to measure the contribution in percentage points of each hierarchic level (subclass, class, group, division, section) to the monthly (current year, or last twelve months) change of the total index.

Monthly contribution: it measures the contribution in percentage points of each hierarchic level (section, division, group, class and subclass) to the monthly change of the total of the index.

$$CM = \left(\frac{I_a \ last \ month}{TN \ Index \ last \ month}\right) * P_a * VM_a \div 100$$

Contribution in current year: it measures the contribution in percentage points of each hierarchic level (section, division, group, class and subclass) to the current year change of the total index.

$$CAC = \left(\frac{I_a \ December \ of \ the \ previous \ year}{TN \ index \ December \ of \ previous \ year}\right) * P_a * VAC_a \div 100$$

Contribution last twelve months: it measures the contribution in percentage points of each hierarchic level (section, division, group, class and subclass) to the twelve months change of the total index.

$$C12M = \left(\frac{I_a \ same \ month \ of \ the \ previous \ year}{TN \ Index \ same \ month \ of \ the \ previous \ year}\right) * P_a * V12M_a \div 100$$

- **Share**

It is the percentage of the contribution of each hierarchic level (section, division, group, class or subclass) monthly, in current year and in twelve months change of the total index.

Monthly share: it is the percentage of the contribution of each hierarchic level (section, division, group, class or subclass) in the monthly change of the total index.

$$PM = \left(\frac{CM \ of \ the \ hierarchical \ level}{TN \ monthly \ variation} \right) * 100$$

Current year share: it is the percentage of the contribution of each hierarchic level (section, division, group, class or subclass) in the current year change of the total index.

$$PAC = \left(\frac{CAC \ of \ the \ hierarchical \ level}{TN \ current \ year \ variation} \right) * 100$$

Twelve months share: it is the percentage of the contribution of each hierarchic level (section, division, group, class or subclass) in the twelve months change of the total index.

$$P12M = \left(\frac{C12M \ of \ the \ hierarchical \ level}{TN \ 12M \ variation} \right) * 100$$

Where:

a: Hierarchic level

I_a: Index of the hierarchic level

TN: Nacional total

P_a: Weight of the hierarchic level

VM_a: Monthly change of the item

VAC_a: Current year change of the item

$V12M_a$: Twelve months change of the item

CM: Monthly contribution

CAC: Contribution in current year

C12M: Contribution in twelve months

2.1.6 Plan of results

The results corresponding to the PPI research are published monthly in DANE's webpage using a press bulletin, a press release, Annexes and a presentation where the outstanding results are summarized for the users (external and in-house).

2.1.6.1 Design of tables of outcomes (results)

The published Annexes of the PPI correspond to a consolidation of the total indices, changes, contributions and shares (monthly, in current year and twelve months) by ISIC Rev. 4 A.C section, division, group and class classes and according to CPC version 2 A.C five digits subclasses

- The price index presented are:

    Domestic production,

    Internal supply,

    Goods produced for domestic consumption,

    Imports,

    Exports,

    Final goods of domestic supply,

    Final goods produced for domestic consumption,

Imported final goods,

Intermediate consumption goods,

Final consumption goods,

Construction materials,

Capital goods

Final demand.

The information is published monthly on the 4th of the month following that of reference or on the closest working day and previously to the publication of the CPI.

2.1.6.2 Design of the form (questionnaire)

The questionnaire is an electronic form, previously completed, in which the source reports the prices of products. Figure 1 below shows the form used by the informant source via WEB followed by a short description of the sections of this tool.

Figure 1. Collecting Form of the PPI

Source: DANE.

Section 1: It corresponds to the identification data of the source and its geographic location.

Section 2: It corresponds to the information of the specific products that each source has to report. In this section the informant source may report the prices of the product and if necessary, it might update the specifications or include new quotes.

The complete description of the questionnaire is in the Manual for Completing the PPI form that presents the instructions for the proper reporting of quotes by the sources.

2.1.7   Norms, specifications or editing rules, consistency and imputation

a. Specifications of consistency and editing

The consistency and editing are implemented with the support of set out criteria, presented in different manuals and according to methodologically established protocols. There are two reference tables generated monthly, for quotes and for sources:

- E_**SOURCE**_AAAA_M: This input table contains the identification data of the informant sources.

- D_**QUOTE**_AAAA_M: This input table contains the information of the monthly records that will structure the database for the calculation of the index. It is generated on a monthly basis and it contains the information for the identification of the product, its previous and present price, its origin and the currency in which the price was reported.

  The editing specifications include the field, the description, the value and the observation while the consistency specifications presents, besides the previous elements the rule that must comply the registered information. (See Annex C).

b. Imputation Process

The imputation processes in the PPI research are related to new events that must be treated before the calculation process, when some existing situation with the source or with the specific product generates a lack of information. These new events are applied to the quotes of products with respect to the calculation.

The imputation takes place when there is no price information. This missing price may be due to specific situations of the product or to specific situations of the source, which are directly related with the new events mentioned next:

In methodological terms, these situations imply that the products with missing quotes are temporarily out of production or of commercialization. In these cases, the prices of products reported by these establishments are imputed with the actual changes observed for other items belonging to the same CPC subclass.

This imputation procedure might be implemented for a maximum period of six continuous months. In case of exceeding this time, the informant source is analyzed by the research staff, which can decide to replace it with related products, either within new sources or within existing ones in the business register.

New events regarding products: the possible new events regarding products refer to situations in which the information of quoted prices is missing and a process of imputation is required: these happen when:

Issue: Period of delay: this issue occurs when the source does not report price because it is inactive, or it has not been located or "in debt".

Issue: Seasonality: this issue relates to seasonal factors and the production or commercialization of the product only happens in certain periods of the year.

In the cases in which new events regarding products occur, the prices are imputed using the same previously explained methodology of the average changes.

2.1.8 Classifications used

a. Central Product Classification (CPC) Version 2.0 A.C

Until 2006, the PPI used a subclass that was derived from ISIC Rev 3 A.C. as the maximum level of breakdown for the publication of the index. This subclass was used in order to generate indices with greater detail for the breakdown of the economic activities that allowed as well to satisfy the needs of the users.

DANE eager to provide continuity with the information presented by the Banco de la República, found in the CPC a tool that allowed to show, in a technical way, a disaggregated index and simultaneously to establish a correspondence with ISIC.

The CPC groups goods that have common characteristics and their categories or hierarchies are based on the physical properties and the intrinsic nature of products. This classification maintains close relationship with ISIC which main criterion is centered on the industrial origin.

In order to establish the direct relationship between both classifications used in this research, an equivalence table was set up, by which each CPC ver. 1.0 A.C subclass corresponds to a unique ISIC Rev 3 A.C class.

From the time of redesign of the PPI, the Central Product Classification was updated to version 2 for Colombia (CPC Ver. 2 A.C.). It is a standard central classification that includes categories for all the products that can be the object of national or international transactions or that can be stored. It includes products originated from an economic activity, including transportable and non-transportable goods. For the PPI research only transportable goods are taken.

The main changes between the CPC ver. 2.0 A.C and the CPC ver. 1.0 A.C were: breakdowns, changes in the names and enlargement of the groups, classes and subclasses. For example: in group 011, "Cereals", of the version 1.0 A.C, the classes 0116, "Rye" and 0118, "Millet", with their corresponding subclasses were created.

Finally, the CPC is specifically related to the Harmonized System[9] and that guarantees the international comparability of the classifications used.

b. International Standard Industrial Classification (ISIC) Rev. 4.0 A.C

In order to give continuity to the basic structure of the index published until December of 2014 and with the purpose of guaranteeing the international comparability, from the redesign of the PPI, DANE uses ISIC Rev. 4 A.C to classify economic activities[10]. This classification also includes a classification of products according to their main economic activity of origin. Some of the changes that appeared with respect to the ISIC Rev 3.A.C were the structure of some economic sectors, as for example the reduction of the first four sections to three, in such a way that section A includes now Agriculture, cattle farming, hunting, forestry and fishing, B Operation of mines and quarries and C Manufacturing as shown in Table 1B of Annex B.

c. Classifications according to origin of the goods

This classification makes reference to the origin or destination of the goods followed up in the indices described in numeral 2.1.5 of this document:

- Goods produced for domestic consumption: they correspond to the goods produced in the country whose destination is to be traded in the internal market.

- Imported goods: they correspond to the goods that enter the country to be consumed or to be transformed.

- Exported goods: they correspond to the goods produced for the international market.

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[9] The Harmonized System (HS) is a model for the classification of products developed by the World Customs Organization. Its intention is to create a multi-purpose standard for the classification of the goods traded worldwide.

[10] DANE (2012). Clasificación Industrial Internacional Uniforme de todas las Actividades Económicas, Rev. 4.A.C. Bogotá

d. Classification according to use or economic purpose (CUODE)

It is a classification that identifies the goods according to the use or economic purpose. This classification allows to carry out different types of economic analyses. The economic purpose for the PPI are goods for: final consumption, intermediate consumption, capital formation (BK) and construction materials (MC).

2.2 STATISTICAL DESIGN

2.2.1 Basic components of the statistical design

a. Universe

The universe of study of the PPI corresponds to all the producing and commercial establishments dedicated to agriculture, cattle farming, hunting, forestry, fishing, operation of mines and industrial activities, located within the national territory.

The ideal source of primary information for the activities of agriculture, cattle farming and fishing are the farms and the centers of production, however, given the conditions of logistics and opportunity informant source being used is the Information System of Prices of the Agricultural Sector (SIPSA) for those products of domestic consumption.

b. Objective population

It includes all the establishments that produce or commercialize products that included in the basket of product which prices serve for elaborating an index in the different economic sectors.

c. Statistical framework

The sampling framework is provided by the register of establishments specialized in the production and commercialization of transportable goods. For the goods produced for domestic consumption information is taken from the Annual

Manufacturing Survey for the industrial sector and from the registers of National Accounts for the other sectors. Additionally information from wholesale market-places of the country was taken trough through SIPSA (Information System of Prices for the Agricultural Sector).

For the imported and exported goods, registers from the foreign trade statistics were used.

d. Included Variables

- Classification variables:

   According to Economic Activity: by Section, Division, Group and Class of ISIC rev4 A.C

   According to Products: Subclasses of CPC ver 2 AC.

- Variable of Analysis:

   Prices of goods.

- Calculated variable:

Laspeyres type Indices. Geometric average of relative prices and Weighted Arithmetic Average in the different levels of aggregation.

e. Sources of data

The PPI is a non-probabilistic type of research. The informant sources are selected according to the products included in the basket of the index, their possibility of reporting the information and the continuity in the production or commercialization of these products.

f. Geographic coverage

The PPI has a national coverage, broken down by economic activity, origin or destination according to the international classifications used. The information is collected from the following cities: Cartagena, Villavicencio, Valledupar, Santa Marta, Cali, Ibagué, Barranquilla, Bucaramanga, Pasto, Armenia, Montería, Neiva, Popayán, Bogotá, Manizales, Tunja, Medellín, Cúcuta and Pereira.

g. Geographic breakdown

The results are consolidated at the national level.

h. Thematic breakdown

The information is disseminated as indices, changes and shares for the national total: according to economic activity (Section, Division, Group and Class) and products (Subclass).

i. Basic price

It is defined as the value of the product at the time of the first transaction (change of property). This price includes the discounts and other incentives of general character offered to all the buyers. Should be excluded: the consumption taxes and VAT; the transportation expenses and the trade margins. This value is taken according to the origin of the goods as recorded by the informant source. The prices corresponding to the different origins are described as follows:

Domestically produced goods for domestic consumption: the sale price in factory (ex-factory) excluding indirect taxes (VAT, consumption). For the agricultural sector the monthly average of the prices from SIPSA is taken.

Imported origin: two different prices are taken depending on the use of the product (raw material or finished product):

- Raw material: CIF (Cost, Insurance, Freight).

- Finished product: sale price (Ex-factory) without taxes, transport charges, in the currency used for transaction.

Exports: FOB (Free On Board). This price does not include: the freight and the insurances for the transport from the border of the origin of the product to the destination place, that is, it corresponds to the price in the customs border of the exporter.

2.2.2 Statistical units

a. Unit of observation

It corresponds to the producing and trade establishments, related to the domestic and foreign trade of the country selling their products in the first stage of commercialization within the productive structure of the country.

b. Unit of analysis

The items included in the basket for the follow-up of the prices of the index, even though the publication requires the aggregation in the construction of the first fixed level (CPC subclass).

c. Unit of sampling

They are the producing or commercial establishments.

2.2.3 Periods of reference and collection of information

a. Period of reference

The research has a monthly periodicity, therefore the period of reference is the month in which the prices are collected.

b. Period of collection of the information

The collection of the information is done from the 15th to the 28th day of every month. Due to the volatility of the agricultural prices and commodities, a monthly average of the prices is taken for the month of reference. The prices reported for manufactured goods correspond to the actual one in the 15th day of every month.

2.2.4 Sample Design

The sample design of the PPI is non-probabilistic. However, the sampling staff realizes, every month, an analysis of the changes of prices defining the minimum number of sources needed for each product included in the follow up.

For domestic production, the sample of industry sources is done with the criterion of a minimum participation of 80% of the value of production. The sources of the agriculture, forestry and fishing sector were obtained directly from SIPSA, whereas the foreign trade sources are selected with the criterion of a minimum participation of 80% of the traded value.

a. Type of sampling

The PPI is a research realized through non-probabilistic sampling.

b. Definition of the sample size

The PPI counts approximately on 3,200 sources and around 15,000 monthly quotes. The size of sample is defined by the sample design group based on the variability of the geometric average of the prices admitting a relative error of 5%.

c. Calculation of precision of the results

The PPI manages a 5% relative error at the maximum level of disaggregation of the information handled.

2.3 OPERATIONAL DESIGN

2.3.1 Training System

The training of the personnel associated to the collection of the information is a factor of great importance and is the object of a permanent process of quality control. A continuous training scheme is used; it underlines the evaluation of the results, the methodological changes and the technical evolution of the index.

An instruction process is organized annually in order to guarantee the technical level of the tie personnel within the project. The following stages are included:

- Analysis of the needs: oriented towards the identification of the abilities and the specific knowledge required for developing a work of quality within the project.

- Design of the training method: the content of the program is elaborated with the support of pamphlets, books and oriented activities.

- Concrete training: practical development of the training program activities

- Evaluation: the success or failure of the program is determined

2.3.2 Preparatory activities

a. Awareness-raising process

This activity is under the responsibility of the coordinator of the PPI research. Its objective is to guarantee a complete knowledge of the results of the research and to facilitate the accessibility to the different informant sources participating in the project.

The awareness-raising process includes three main stages:

- The selection, qualification and training of the operational personnel in charge of the direct contact with the informant sources and the collection of the prices of the products of the basket.

- The identification of the informant sources according to the items required for the generation of the index.

- The training of the informant source for delivering the information with monthly frequency, according to the technological means available to them. The means available are: completion via webpage, telephone, fax and printed form.

b. Selection of the personnel

The operational personnel plays an important role in the research. They are in charge of the contact with the informant source and of the collection of prices. This group includes:

- Analysts: staff whose functions are: the collection, validation and capture of the information given by the sources.

- Coordinators: they are in charge of control functions, the coverage of the operative and the management analyses. These functions are concentrated in the stage of revision of the information consistency and control of debt of the informant sources. The basic functions of coordination in the PPI are:

- To generate the information corresponding to changes in prices higher than the parameters of validity established for the research (outliers).

- To verify the consistency and to supervise the information collected by the work group.

- To establish the veracity of the changes of prices of those of random selected products.

- To identify the items that deserve direct supervision and follow up.

- To respect the collecting and the closing dates.

- To consolidate the reports on enterprises and establishments in debt.

- To develop the established activities for quality management.

- To keep total reserve on the identification of the sources, its prices and products.

- To stay updated on the characteristics and evolutions of the local market.

- To locate new sources when needed, in agreement with the established criteria and permanently updating the respective registers.

  - Thematic staff: staff in charge of defining the methodological process of the research, to realize the processes of analysis, to perform the required calculations, produce the documents of dissemination of the information, and indicate the proper path to the logistics, thematic and systems groups of the research.

  - Logistics: staff in charge of the analysis, revision, editing, correction and quality of the information originating in the regional directions.

  - Systems staff: they provide maintenance, support and develop the software for the databases resulting from the research.

2.3.3. Design of instruments

The instruments for the processes of collecting and controlling the data are:

- Editing manual

- Completion Manual

- User Manual

- Systems Manual

2.3.4 Data collection

a. Operative scheme

The objective of the operative process of the PPI research is the continuous publication of reliable figures of a high level of technical quality. The operational structure is geared towards this objective and centers its human capital in the logistical processes related to the collection of information. This structure includes the coordinator, the thematic team, the systems team and the logistics team.

- The coordinator must define the schedule of the work and the basic guidelines towards the continuous improvement of the thematic, systems and field logistics teams.

- The thematic team is in charge of verifying, analyzing and publishing the results of the process.

- The systems team is in charge of giving technical support in all the stages of the process, from the capture of the information to the publication and delivery of results.

- The field logistics team executes the tasks related to the collection of the prices of the products included in the index.

b. Methods and mechanisms for collecting prices

The process of collection of the PPI prices is realized using DANE's webpage, where the source reports the requested information on a monthly frequency. This reduces the operative cost and the delay in response.

The collection procedure is summarized as follows:

- If the source has just been included in the research and reports for the first time, an explanation about the importance of its participation is made personally (or through telephone call or e-mail). A Manual of the Electronic Form is also provided; this manual gives instructions on how to use the web and how to auto-complete the form. If the source does not have the technological infrastructure required, alternative means for collecting the prices are provided.

- The collection as such initiates with the process of capture of the information on the 15th day of every month once the webpage is enabled so that the informant source reports the prices of the products. The sources have seven working days as of the date to enter the information

- Finalized the seven working days, the coordinators of each regional office generate the information corresponding to the sources that present inconsistencies in the information provided, or if they are "in debt" for completing the form.

- As soon as the information is generated, the new events reported by the sources are reviewed, and if it is necessary to communicate with them, this is done by telephone or by e-mail, to ask for the missing information or to request explanations about the observed inconsistency.

- For the 27th day of the month, DANE headquarters generates the information at national level and consults with coordinators to consolidate the number of new events and "in debt" situations.

- For the 30th day of the month, the collection procedure is over and the processing of results begins.

The system of collection of the PPI uses a combination of methods focused in the increased use of technological tools in order to reduce the response time by the source and to lower the operative costs. The methods used are as follows:

- Self-completion of the electronic form via webpage.

- Self-completion of the paper form and delivery by fax or e-mail.

- Collection by telephone with the support of the analysts of the research.

c. Data transmission

The PPI collects and captures the information via Web.

d. Capture of information

The process of capture of the information is realized simultaneously with the process of collection, since it uses a system of free self-completion with electronic form via the webpage. The information collected by telephone or via e-mail is recorded in the system of capture of data of the research by the logistics team.

e. Consolidation of files

In order to consolidate the files some preliminary activities to the completion process are implemented such as the input of sources and of the products they report about to the Oracle software with Java interface.

The input of informant sources or previously verified products conforms the main base. It is considered ready for processing and generation of results once the editing processes have been finalized.

f. Control of coverage

The mechanisms to control the loss of information are the following: If the information of some source in the month is missing, the analyst calls and consults the reason why the source has not been able to report its prices and a follow-up is initiated until the source can register the corresponding information (offering the necessary advice).

2.4 SYSTEMS DESIGN

The PPI has been developed using the architectural pattern for WEB applications MVC Model. This is implemented on 2 technologies J2EE-JAVA Enterprise Edition that are editions of Java focused on the business logic. Additionally they use the philosophy of development in N layers, where each layer separates the presentation into what the end user sees in the screen, the business logic and the persistence towards the data base.

When differentiating clearly the layers, the independence between them can be observed. This allows a fast and easy maintenance of each components.

The technologies used for each layer that composes the application are:

- For the layer of the view where the display elements of the application are written, JSF is used (Java Server Faces).

- The elements corresponding to the control layer where the navigation logic is modeled, use framework adf-phases of Oracle.

- For the layer of business or services where the logic of the business is described, components EJB of Session were used.

- The logic of persistence of data is developed handling EJBs of organization, where the basic objects of data are mapped using JPA transcription methods.

- The data repository is an ORACLE version 11i database.

2.4.1 Main modules

The modules of the PPI are associated with each phase that constitute the life cycle of the generation of the index. The following modules available are:

System Management Module: in this module the different processes of the system are defined. Currencies types as well as the value of the representative rates of the market are defined. The periods and the associated states are stated; the types of indices are delimited; the classification trees corresponding both to CPC and to ISIC are managed and the economic origins and purposes also. This management module also allows to manage the register base, that is, to insert, to update and to eliminate sources, quotes and specifications of the PPI research.

Collection Module: it consists of an electronic form previously completed in which the source provides the prices of the products. In the same way, this module allows to load the operative directory of sources and quotes.

Logistic Module: it allows to measure the advance of the operative of collecting prices.

Execution Module: it admits to execute all the processes defined for the investigation in the administration module. In this module, the massive processes of pre-completion of the electronic forms or the calculation for a given period can be executed, among others.

Analysis Module: In this module the edition and analysis of the microdata provided by the sources is performed, once the electronic form is completed. In this module it is possible to apply technical new features, to observe the variations of the prices of products, etc.

Dissemination Module: it generates in different types of files (pdf, excel, HTML) the results of the calculation of the index on a monthly basis.

2.5 DESIGN METHODS AND MECHANISMS FOR QUALITY CONTROL

2.5.1. Procedure of codification and editing

During the editing process, the staff concentrates on four fundamental aspects for the control of the information and its corresponding quality:

- To guarantee the continuity of the specifications of collection of each of the products that belong to the basket of products. These must also maintain the requested characteristics of the products overtime

- To verify the changes in prices from month to month and request explanation from the sources on any anomaly.

- To make telephone or e-mail follow-up to the informant sources that did not report prices and to request the corresponding update.

- To update the registers.

2.5.2. Analysis of the quality of results

The guidelines for the development of the quality indicators of the PPI have been based on the IMF recommendations included in the **Data Quality Assessment Framework for the Producer Price Index**[11]. On the basis of this reference, procedures and indicators were elaborated to follow up the quality of the results:

Percentage of informant source "in debt": it measures the percentage of informant sources that did not report the information on prices in the established periods. Its objective is to control the effectiveness of the collection process. The coverage is the national aggregate and has monthly periodicity.

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[11] Data Quality Assessment Framework for the Producer Price Index. IMF. Kimberly Zieschang and Paul Armknecht. (2003)

$$Deu\ (\%) = \left(\frac{FI_d}{FI_t}\right) * 100$$

Where:

Deu (%) = Percentage of informant sources that were "in debt" for period t
FI_d =   Number of informant sources that were "in debt" for period t
FI_t =   Total number of informant sources for period t.

Percentage of informant sources reporting new events: it measures the percentage of sources that presented some type of new event in period t, for example non located or inactive enterprises. Its objective is to control the effectiveness and quality level of the register of sources that are the basis for collecting prices. The coverage is the national aggregate and has monthly periodicity.

$$Nov\ (\%) = \left(\frac{FI_n}{FI_t}\right) * 100$$

Where:

Nov (%) = Represents the percentage of sources that presented some new event for period t.

FI_n =   Number of sources presenting some new event in period t

FI_t =   Number of informant sources for period t.

2.5.3. Indicators for the quality control of the processes of the research

With the purpose of determining the quality of the processes, the following indicators of quality are analyzed:

Answering or coverage rate by sources Index (ITRF): it corresponds to the ratio between the number of sources that were contacted and the number of pre-completed sources. It determines the answering level or coverage in terms of the visited or surveyed sources, compared with the expected number of sources programmed or selected in the research.

ITRF= ((total pre-completed sources **+** new source **–** non-found sources**)/**total pre-completed sources)*100**.**

Where:
The pre-completed sources are the actual ones according to the new events of the previous period

The new sources correspond to those introduced for the first time in the present period.

The non- found sources are those that were searched in order to get in touch with them by electronic means, phone call or visits and which were not located.

Answering or record coverage rate Index (ITRR): it corresponds to the relationship between the number of records of variables collected with the software with actual information and the expected number of records of variables according to pre-completed forms. It determines the degree of actual answer or coverage in terms of the records, compared with their expected number.

The actual records are those in which technical conditions are not used to generate missing information, i.e. change of reference. It includes zero as answer for actual records; new events that generate actual imputation (in hold status) or variations (immediate substitution), are considered as actual records.

ITRR   **=** (*total quotes-cr-is/pred. quotes*) *****100

Where:

Pred. Quotes   =Number of pre-completed products for collection.

cr   =Records with change of reference indicated as new event.

is   =Records eliminated in the present period

Total quotes   = Actual records (information **without** technical new events that produce missing information (cr).

Non-imputation or Non-estimation Index (INI): it corresponds to the difference between the total number of records and the number of records with a technical new event that generates a process of imputation or estimation and its relationship with the total expected records. It indicates the level of imputation or estimation used within the research. It is the difference between the total expected records and those marked as imputation. This last process is carried out at the headquarters on information that has been already edited and verified at the regional level.

INI= (total quotes-records in on-hold status) /total quotes) *100

Where:

Total quotes   = Number of pre-completed products for collection

Records in on-hold status   = Records to be imputed or estimated.

Quality Index 1 (IDC1): indicator of the quality of the processes: it is generated through the verification of the quality in the stages of collection and analysis. It determines the quality level of the productive processes, using the difference between the tasks carried out in an appropriate manner and the omissions or errors found in each process. This indicator is useful for making a disaggregated analysis, mainly at local level, of the omissions generated both in the collection and in the analysis and editing stage.

IDC1 **=** (ICR + ICA)/2

Where:

Collection quality Index (ICR): It is the difference between the expected or pre-completed number of records and the number of records that present errors in the collection process, at local level. It is generated in order to make a more detailed analysis, of the omissions introduced in the collection process.

ICR= (RES-number of records with errors in the collection) /RES) *100

Where:

RES = Number of expected records based in the pre-completed records

Quality in the analysis Index (ICA) is the difference between expected or pre-completed number of records and the number of records that present errors in the analysis and editing process at the local level. It is generated in order to make a detailed analysis of the omissions generated in the process of analysis and editing.

ICA= (RES-number of errors in the process of analysis and editing) /RES) *100

Quality Index 2 (IDC2): it represents the sum of all errors and omissions (inadequate treatment of product) generated in all the stages of the process: collection, analysis, etc., with respect to the expected total of records. It defines the quality level of the productive processes of the research, from the difference between the work carried out appropriately and the errors and omissions found in each process, expressed as a percentage of the total expected information. This indicator is useful to make an analysis of the information aggregated at national level without considering the analysis at local level.

IDC2 = ((RES-TPNC)/RES)) *100

Where:

IDC2   = Quality Index 2

TPNC = Inadequate treatment of products: it corresponds to the sum of errors and omissions in the quality control processes corresponding to editing and capture.
RES= Expected number of records

Reliability Index (ICFA): it corresponds to the simple average of all the quality indicators of the chain of processes of the research.

ICFA = (ITRF + ITRR + INI+IDC1+IDC2)/5

Where:

ITRF= Answering or coverage rate by sources Index

ITRR= Answering or record coverage rate Index

INI = Non-imputation or Non-estimation Index

IDC1=   Quality Index 1

IDC2=   Quality Index 2

2.6 DESIGN OF THE ANALYSIS OF RESULTS

2.6.1 Statistical analysis

The descriptive analysis of data in the PPI is centered in the validation of the change of prices of the products in the basket of reference (*Pt*), between the periods *t* and *t* -1 on a monthly basis.

$$Var\ (Px) = \left(\left(\frac{P_t}{P_{t-1}}\right) - 1\right) * 100$$

The changes that are outside of the average range of the subclass, require justification. This analysis is realized in two stages of the operative process. The first stage takes place at local level where the analysts verify the changes concerning quotes of the sources assigned to their region. The second stage is realized at the central level; where all the atypical behaviors analyzed at the local level, are controlled

again so as to verify whether the comments and solutions to the atypical cases are within the established thematic guidelines for the research.

These analyses and the corresponding record modification are done directly on the price capture application of the PPI, via Web. The module of the application used in this revision process appears in Figure 2.

Figure 2. Module of information analysis

Source: DANE.

2.6.2 Context Analysis

The changes of the PPI are compared in the first place with the results of secondary sources of the sectors covered by the index. Additionally, the historical coherence of the results is reviewed by comparing the monthly changes (and also in current year or during the last twelve months) versus the corresponding changes observed in the previous year. The evolution and the significant behavior of the prices (increases and

decreases), at national and international level, is used as a tool of thematic analysis. The information available from the media referring to the behavior of the different economic sectors is also taken into account.

2.6.3. Experts Committees

An internal committee takes place every month to present the results of the PPI to DANE staff in charge of other research areas that may serve as a contrast reference for the index. The results presented refer to the last month, the current year and the last twelve months.

Comparisons are also made with other researches, with the international context and the logistic report. A monthly committee allows to inform the external users explicitly on the results of the PPI on a confidential way.

These two committees are realized previously to the publication of the results.

2.7 DISSEMINATION DESIGN

2.7.1 Administration of the data repository

The processes of storage of the results and the databases of the PPI are realized centrally and are responsibility of the systems and thematic teams of the research at DANE headquarters in Bogota.

The processing section stores the tables related with the identification of the sources and the prices reported for the products of the basket. These tables are classified on a monthly basis by the systems team using as format the archives dba_ objects for Oracle.

Regarding the delivery of results, the thematic team stores the historical series of the indices in Excel format and the publication bulletins in Word format, which remain at DANE headquarters.

2.7.2 Products and instruments of dissemination

The research of the PPI delivers the following products to the public in general on the 4th day of the month or on the closest working day preceding the CPI, on DANE's webpage:

- Technical bulletin: which includes the general results of the index for the month of reference.

- Press release: an official communication that includes a synthesis of the results of the research.

- Informative Annexes: They include series of the indices as well as their changes, contributions and shares at the different levels of publication.

- Historical Annexes: series of the indices and their historical changes for indices classified by use or economic purpose (CUODE). Also, the historical series of total internal supply and domestic production with their respective sections are presented since June 1999.

The results published in Excel format contain the change, contribution and share (monthly, in current year and twelve last months) of the following indices:

- Domestic Production Price index

- Internal Supply Price index

- Goods Produced for domestic consumption Price Index (PYC)

- Imported goods Price index (M)

- Exported goods Price Index (X)

- Domestically Consumed Final goods Price Index (BFOI)

- Domestically Produced Final goods for Domestic Consumption Price Index (BFPYC)

- Imported Final goods Price index (BFM)

- Construction materials Price Index (MC)

- Intermediate consumption goods Price index

- Final Consumption Goods Price index

- Capital goods Price Index (BK)

- Final Demand Price Index (DF)

This information is published monthly on DANE's webpage for internal and external users, and in the National Data Archive (ANDA), from where these statistical data can be accessed.

DESIGN OF THE EVALUATION

Fulfilling the quality standards is nowadays fundamental in the production process of statistics. As a consequence, the design of the evaluation in the PPI research constitutes an important mechanism to give a proper treatment to this information.

The evaluation of the research of the PPI, is a continuous process, in several stages going from the design to the production and dissemination processes. It includes among others:

- *Certification by international experts*: It consists of periodic visits of experts of different international organisms in charge of the evaluation of all the associated processes of the index: system components, applications (application nets), calculation and capture recording, components of the sample design, results and dissemination and finally the approach to external and internal users.

- *Survey of users' satisfaction*: It is a tool to know the needs of the users. This is a task shared with the Databank of the organization that is the first channel of contact with the users.

- *International recommendations*: During the process of design, and induction stage as well, this research receives technical advice from international organizations such as the International Monetary Fund (IMF) and some National Institutes of Statistics with experience in indices. Both report on diagnosis and recommendations for the implemented process.

- *Internal and external committees*: Monthly meetings are realized with the purpose of analyzing the results of the research in a context of economic short term analysis and by informing some users on the results of the PPI in explicit and confidential way. These two committees are realized previously to the publication of the results. In these committees suggestions and recommendations of users and advisers are received, and constitute a permanent evaluation of the research.

3. RELATED DOCUMENTATION

The related documentation that supports this methodology is the following:

- Methodologic card of the PPI: document that presents a brief review of the basic guidelines of the research.

- Methodology of PPI 1991, 1999 elaborated by the Banco de la República and the methodology of PPI 2009 elaborated by DANE, documents that present the methodological design of the Producer Price Index.

- Methodology of design of systems relating to PPI: document deepening in the technical characteristics and systems support for the process of calculation of the index.

- User Manuals for the PPI system: document that illustrates the access to the computer systems of the PPI.

- Correlative Subclass CPC Rev 1 A.C - Class ISIC Rev 3 A.C and CPC Rev 2 A.C - Class ISIC Rev 4 A.C: documents that illustrate the relationship between a product group (subclasses) as those defined by the CPC and a class in the ISIC classification.

- Matrix of weights: table that shows the relative weight of each product group within the total calculation of the index.

- Glossary of terms of the PPI: document that explains in detail the terms used within the research of the Producer Price Index.

GLOSSARY[12]

Annual variation: percentage change calculated between the period of reference (t) and the same period of the previous year (t previous year).

Base unit: it is the unit used as standard measure of the amounts associated with the observed price. A conversion of prices is necessary when the price observed does not correspond with this unit, since the prices only can be compared when they are referred to the same unit of weight, volume or quantity (in units).[13]

Basic basket: Representative set of goods and services for which the statistics office does follow up of prices. This basket is set up taking a base year as reference.

Capital good: it is a good used repeatedly (for more than a year) in the process of production of other goods or services, such as machines, equipment, etc.

Change of reference: It is a condition that allows facing the change of quality of a given product. The absence may be the result of market conditions or of changes in the primary characteristics of a specification, those that differentiate one product from another or even varieties of the same product. The change of reference is a procedure to grasp implicitly the changes of quality in products.

Chained Index: It is an index number series for a given aggregate spanning a long sequence of periods obtained by linking index numbers spanning shorter periods, each one with their own weights.[14]

Consumer good: good or service bought and used directly by the end user. It does not require any productive transformation.

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[12] With some exceptions the definitions included in this glossary were taken from: http://sen.dane.gov.co:8080/senApp/module/conceptosModule/index.html.

[13] IDANE, METODOLOGIA INDICE DE PRECIOS AL CONSUMIDOR – IPC 09-08-2013

[14] Definition taken from: Producer Price Index Manual: Theory and Practice. International Monetary Fund. Statistics Department. September 3, 2004.

Data collection: process by which data are obtained through different types of surveys or administrative records.

Elementary aggregate: it is a relatively homogenous set of goods both in its physical characteristics as in the behavior of the variations of the prices.

Elementary aggregated Index: an index calculated as a geometric average of the quotes of prices collected from the sources.

Immediate substitution: it is used to face the absence of a specification replacing it by a perfect substitute, taking into account all the characteristics of quality, using as a proxy of this concept the price, the quantity and the brand. The effect on the calculation system is of small variations in minimum ranks.[15]

Index Number: amount that shows, by its variations, the changes over time or space of a magnitude. The most important characteristics in the construction of an index number are: coverage, base period, weighting system and method for averaging the observations.

Index of Jevons: it is defined as the unweighted geometrical average of the current-to base period price relatives. It is an elementary index.[16]

Intermediate good: goods and services other than capital goods that are used as inputs in the processes of production of an establishment and are produced by other economic sectors or are imported. In addition, they have to be transformed or completely consumed during the production process. Land, labor and capital are primary inputs consumptions and they are not included within the intermediate inputs, denominated also "intermediate products".

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[15] DANE, METODOLOGIA INDICE DE PRECIOS AL CONSUMIDOR – IPC 09-08-2013

[16] Definition taken from: Producer Price Index Manual: Theory and Practice. International Monetary Fund. Statistics Department. September 3, 2004.

Laspeyres Price Index: Price index defined as fixed basket of fixed weights index, this index uses the basket of goods and services of the base period. The base period refers both to the period of reference of the weights as to the period of reference of the prices.

Modified Laspeyres Price Index: In this type of index, the price of the current period is compared directly with the price of the previous period and indirectly with the price of the period on which weights are based.[17]

Monthly variation: Percentage change of the month with respect to the previous month. Such rates are expressed as $((M_t / M_{t-1}) - 1) *100$.

Period of reference: period of specific time (day, week, month, year) or point in time to which corresponds the realized observation, or the variable of interest.

Period of reference of the prices: it refers to the period associated to the prices that are compared with the current prices

Period of reference of weight: usually a year, corresponds to the period of time for which the weights are calculated.

Press bulletin: It is a communication of official character that presents the main indicators and aspects of the statistical research that is being disseminated.

Press release: it is an official communication that contains data of the statistical research disseminated in a summarized format. It can be defined as the summary of the statistical press bulletin and it is disclosed to mass media.

Producer Price index (PPI): it is an index that measures the average variation of the prices of a basket of goods representative of the internal supply in its first stage of commercialization. Internal supply includes domestically produced goods as well as goods imported to the country.

Variation: calculated percentage change for a variable in a given period in relation to another one

Variation in current year: calculated percentage change normally between a given month of the year and December of the previous year.

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[17] Ibid

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ANNEXES

Annex A. Output tables, Producer Price Index (PPI)[18]

The following list includes the main output tables of the Producer Price Index - PPI

Table A1. Vertical Indices

Table A2. Final Goods Produced for domestic consumption (BFPYC = BK01 + CF01 + MC01)

Table A3. Imported Final Goods (BFM = BK02 + CF02 + MC02).

Table A4. Demand (DF = BK01 + CF01 + MC01 + X)

Table A5. Intermediate Consomption (CI = CI01 + CI02)

Table A6. Final Goods of the Internal Supply (BFOI = BK01 + CF01 + MC01 + BK02 + CF02 + MC02)

Table A7. Total Domestic Supply (OI = PYC + M = BK01 + CF01 + CI01 + MC01 + BK02 + CF02 +CI02 + MC02)

Table A8. Imports (M = BK01 + CF01 + CI01 + MC01)

Table A9. Capital Goods (BK = BK01 + BK02

Table **A10.** Consumption (CF = CF01 + CF02)

Table A11. Construction materials (MC = MC01 + MC02)

Table A12. National Production (PN = PYC + X = BK01 + CF01 + CI01 + MC01 + X)

Table A13. Exports (X)

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[18] These tables are published monthly in the following ling of DANE's webpage (Annex): http://www.dane.gov.co/daneweb_V09/index.php?option=com_content&view=article&id=102&Itemid=76

Annex B. Detailed structure, economic sector PPI basket

Section	Division	Description
A		Agriculture,animal production, hunting, forestry and fishing
	01	Crop and animal production, hunting and related service activities
	02	Silviculture, logging and other forestry activities
	03	Fishing and aquaculture
B		Mining and quarrying
	05	Mining of coal and lignite
	06	Extraction of crude petroleum and natural gas
	07	Mining of metal ores
	08	Other mining and quarrying
	09	Mining support service activities
C		Manufacturing
	10	Manufacture of food products
	11	Manufacture of beverages
	12	Manufacture of tobacco products
	13	Manufacture of textiles
	14	Manufacture of wearing apparel
	15	Tanning and dressing of leather; manufacture of footwear; manufacture of luggage, handbags and similar products; manufacture of sadlery and harness; dressing and dyeing of fur
	16	Sawmilling and planing of wood; manufacture of products of wood, cork, straw and plaiting materials
	17	Manufacture of pulp, paper and paperboard
	18	Printing, copying from originals, and activities related to printing
	19	Manufacture of coke oven products, manufacture of refined petroleum products and mixing combustibles activities
	20	Manufacture of basic chemicals other chemical products
	21	Manufacture of pharmaceuticals, medicinal chemical and botanical products
	22	Manufacture of rubber and plastics products
	23	Manufacture of other non-metallic mineral products
	24	Manufacture of basic metals
	25	Manufacture of fabricated metal products, except machinery and equipment
	26	Manufacture of computer, electronic and optical products
	27	Manufacture of electrical equipment
	28	Manufacture of machinery and equipment n.e.c.
	29	Manufacture of motor vehicles, trailers and semi-trailers
	30	Manufacture of other transport equipment
	31	Manufacture of furniture ; matresses and bedsprings
	32	Other manufacturing
	33	Repair and installation of machinery and equipment

Source: ISIC Rev. 4 A.C.

Annex C. Table 1 C. E_SOURCE_AAAA_MM

Denomination	Name	Field	Description	Value	Note
Reference	Reference year	Numerical	Year of collection and database generation	Date year	Must be included
Period	Period month	Numerical	Month of collection and database generation	Date month	Must be included
Nordest	Identification of the establishment	Numerical	Numerical code that identifies the source (producer or importer)	Numerical	Must be included
Nomest	Establishment name	Alphanu-merical	Commercial name of the source (producer or importer)	Text	Must be included
Direst	Establishment address	Alphanu-merical	Address of the source (producer or importer)	Text	Must be included
Emailest	Establishment E-mai	Alphanu-merical	e-mail or electronic address of the source (producer or importer)	Text	Must be included
Teler	Establishment telephone	Numerical	local telephone number of the source (producer or importer)	Numerical	Must be included
Nompropie	Owner`s name	Text	Name of the Owner or Legal Representative of the source	Text	Must be included
Dptoest	Establishment department	Numerical	DIVIPOLA Code (2 digits) for the department where the source is located	Numerical	Must be included
Mpiost	Establishment municipality	Numerical	DIVIPOLA Code (3 digits) for the municipality where the informant source is located	Numerical	Must be included
Responde	Responsible	Text	Name of the person who complets the electronic form	Text	Must be included
Respoca	Responsible's position	Text	Position in the organization of the person who completes the electronic form	Text	
Tipodoc	Responsible`s identification document	Numerical	Type of identification document of the person who completes de electronic form	Numerical	
Numdoc	Responsible`s identification document number	Numerical	Number of identification document of the person who completes de electronic form	Numerical	
Dv	Verification digit	Verification digit	Verification digit of the identification number of the person who completes de electronic form	Numerical	
novedad	New event	Numerical	Code of the new event on the operational status of the source	Numerical	Must be included
id region	Regional direction code	Numerical	Code identifying the regional direction of DANE, where the source is assigned	Numerical	Must be included

Annex C. Table 2 C. D_QUOTATION_AAAA_MM

Denomination	Name	Field	Description	Value	Note
Reference	Reference year	Numerical	Year of collection and database generation	Date year	Must be included
Period	Period month	Numerical	Month of collection and database generation	Date month	Must be included
Nordest	Identification of the establishment	Numerical	Numerical code that identifies the source (producer or importer)	Numerical	Must be included
cpc_tematica	CPC_Temática	Numerical	Code of the item at the quotation level	Numerical	Must be included
cpc_l	CPC_Logistics	Numerical	Code of the item at the product level	Numerical	Must be included
nompro	Product name	Alfanu-merical	Commercial name of the product	Text	Must be included
marca	Marca Producto	Alfanu-merical	Trademark that identifies the product or item	Alfanu-merical	
ref	Product reference	Alfanu-merical	Internal reference of the source for identifying the product or item	Alfanu-merical	
procedencia	Product origin	Numerical	Code that identifies the origin of the product or item	Numerical	Must be included
tipomoneda	Currency	Numerical	Code that identifies the currency of the price of the product or item reported	Numerical	Must be included
unidad_a	Unit a	Numerical	Code that identifies the base unit used in the distribution of the product or item	Numerical	Must be included
tipo_unidad_a	Dimension for unit a	Numerical	Dimension of the base unit used in the distribution of the product or item	Numerical	Must be included
cantidad_a	Quantity unit a	Numerical	Quantity of the base unit used in the distribution of the product ot item	Numerical	Must be included
unidad_b	Unit b	Numerical	Code that identifies the second unit used in the distribution of the product or item	Numerical	
tipo_unidad_b	Dimension for unit b	Numerical	Dimension of the second unit used in the distribution of the product or item	Numerical	
cantidad_b	Quantity unit b	Numerical	Quantity of the second unit used in the distribution of the product ot item	Numerical	

Annex C. Table 2 C. D_QUOTATION_AAAA_MM (Final)

Denomination	Name	Field	Description	Value	Note
unidad_c	Unit c	Numerical	Code that identifies the third unit used in the distribution of the product or item	Numerical	
tipo_unidad_c	Dimension for unit c	Numerical	Dimension of the third unit used in the distribution of the product or item	Numerical	
cantidad_c	Quantity unit c	Numerical	Quantity of the third unit used in the distribution of the product ot item	Numerical	
unidad_d	Unit d	Numerical	Code that identifies the fourth unit used in the distribution of the product or item	Numerical	
tipo_unidad_d	Dimension for unit d	Numerical	Dimension of the fourth unit used in the distribution of the product or item	Numerical	
cantidad_d	Quantity unit d	Numerical	Quantity of the fourth unit used in the distribution of the product ot item	Numerical	
novedadprod	Producer new event	Numerical	New event indicated by the source at the time of completing the form. It can not be modified by the analysts (locally or at the headquarters)	Numerical	Must be included
precioant	Former price	Numerical	Price reported by the source in month previos to the month of reference	Numerical	Must be included
precioact	Actual price	Numerical	Current price of the product or item	Numerical	Must be included
NOV_DANE	DANE new event	Numerical	New event indicated by the source and modified by of DANE staff at the stage of analysis	Numerical	Must be included
part.Arancelaria	Customs tariff code	Numerical	Code of customs tariff for imported or exported products according to the source	Numerical	
Observa	Remark	Alfanu-merical	Remarks made by DANE sataff during the analysis	Text	

Annex C. Table 3 C. E_SOURCE_AAAA_MM

Denomination	Name	Field	Description	Value	Note	Rule
Reference	Reference year	Numerical	Year of collection and database generation	Date year	Must be included	Fixed value field,only the year of the operation ex. 2010
Period	Period month	Numerical	Month of collection and database generation	Date month	Must be included	Fixed value field,only the month of the operation ex. 01=January
Nordest	Identification of the establishment	Numerical	Numerical code that identifies the source (producer or importer)	Numerical	Must be included	
Nomest	Establishment name	Alphanu-merical	Commercial name of the source (producer or importer)	Text	Must be included	
Direst	Establishment address	Alphanu-merical	Address of the source (producer or importer)	Text	Must be included	
Emailest	Establishment E-mai	Alphanu-merical	e-mail or electronic address of the source (producer or importer)	Text	Must be included	
Teler	Establishment telephone	Numerical	local telephone number of the source (producer or importer)	Numerical	Must be included	
Nompropie	Owner`s name	Text	Name of the Owner or Legal Representative of the source	Text	Must be included	
Dptoest	Establishment department	Numerical	DIVIPOLA Code (2 digits) for the department where the source is located	Numerical	Must be included	Only 2 digits (XX) according to DIVIPOLA
Mpiost	Establishment municipality	Numerical	DIVIPOLA Code (3 digits) for the municipality where the informant source is located	Numerical	Must be included	Only 3 digits (XXX) according to DIVIPOLA
Responde	Responsible	Text	Name of the person who complets the electronic form	Text	Must be included	
Respoca	Responsible's position	Text	Position in the organization of the person who completes the electronic form	Text		

Annex C. Table 3 C. E_SOURCE_AAAA_MM (Continuation)

Denomination	Name	Field	Description	Value	Note	Rule
Tipodoc	Responsible`s identification document	Numerical	Type of identification document of the person who completes de electronic form	Numerical		Only 1 digit code: 1 for Tax Identification or 2= National Citizenship Card
Numdoc	Responsible`s identification document number	Numerical	Number of identification document of the person who completes de electronic form	Numerical		
Dv	Verification digit	Verification digit	Verification digit of the identification number of the person who completes de electronic form	Numerical		
novedad	New event	Numerical	Code of the new event on the operational status of the source	Numerical	Must be included	Onnly the following two digit values 01= Closed 0 month 02= Change of sector (process) 03= Inactive 04= Not located 05=In "debt" 06=Change of sector (missclassified) 07=Duplicated 08= Merged 09=Splitted 10=Under new control 11=Imputed debts 12=Housing with activity 97=Closed 99=Reports

Annex C. Table 3 C. E_SOURCE_AAAA_MM (Final)

Denomination	Name	Field	Description	Value	Note	Rule
id region	Regional direction code	Numerical	Code identifying the regional direction of DANE, where the source is assigned	Numerical	Must be included	Only the two digit values following
						00= Dane headquarters
						01= Barranquila
						02= Bogotà
						03=Bucara-manga
						04=Cali
						05=Manizales
						06=Medellin
						09=Pereira
						13=Cartagena
						15=Tunja
						19=Popapyan
						20=Valledupar
						41=Neiva
						47=Santa Marta
						50=Villavicen-cio
						52=Pasto
						54=Cucuta
						63=Armenia
						73=Ibague

Annex C. Table 4 C. D_QUOTATION_AAAA_MM

Denomination	Name	Field	Description	Value	Note	Rule
Reference	Reference year	Numerical	Year of collection and database generation	Date year	Must be included	Fixed value field,only the year of the operation ex. 2010. A given establishment should have the same values as table E_SOURCE
Period	Period month	Numerical	Month of collection and database generation	Date month	Must be included	Fixed value field,only the month of the operation ex. 01=January. A given establishment shoul have the same values as table E_SOURCE
Nordest	Identification of the establishment	Numerical	Numerical code that identifies the source (producer or importer)	Numerical	Must be included	There must exist a one-to-one relation between several fields in tables E-SOURCE and D_QUOTATION
cpc_tematica	CPC_Temática	Numerical	Code of the item at the quotation level	Numerical	Must be included	Code from 1 to 12 digits
cpc_l	CPC_Logistics	Numerical	Code of the item at the product level	Numerical	Must be included	Code from 1 to 8 digits
nompro	Product name	Alfanu-merical	Commercial name of the product	Text	Must be included	
marca	Marca Producto	Alfanu-merical	Trademark that identifies the product or item	Alfanu-merical		
ref	Product reference	Alfanu-merical	Internal reference of the source for identifying the product or item	Alfanu-merical		
procedencia	Product origin	Numerical	Code that identifies the origin of the product or item	Numerical	Must be included	Value of 1 digit, than may have only the following values: 1 =Produced and consumed 2=Imported 3=Exported
tipomoneda	Currency	Numerical	Code that identifies the currency of the price of the product or item reported	Numerical	Must be included	Value of one digit 1=Colombian peso 2=American dollar 3=Euro 4=Sterling pound 5= Bolivar-Venezuela 6=Yen 7=Swiss franc

Annex C. Table 4 C. D_QUOTATION_AAAA_MM (Continuation)

Denomination	Name	Field	Description	Value	Note	Rule
unidad_a	Unit a	Numerical	Code that identifies the dimension of the base unit used in the distribution of the product or item	Numerical	Must be included	One digit value 1= Lenght 2=Area 3=Volume 4= Weight 5= Capacity 6= Non classified
tipo_unidad_a	Unit a	Numerical	Base unit used in the distribution of the product ot item	Numerical	Must be included	Two digits value 1=inch; 2= foot; 3=yard; 4=mile;5=nautical mile; 7=brace; 8=milimeter; 9= centimeter; 10= decimeter; 11=meter 12= decameter; 13=hectometer; 14= kilometer; 15= square foot; 16=square yard; 17= acre; 18= square mile; 19=square centimeter; 20=square decimeter; 21= square meter; 22= square decameter; 23= hectare; 24=square kilometer; 25=square inch; 30= cubic foot; 31= cubic yard; 32=barrel; 33= Ton (register, volume); 34= Cubic centimeter; 35= Liter; 36= Cubic meter; 37= Cubic decameter; 38= cubic inch; 39= cubic foot; 40=english gallon; 41= US gallon; 42= ounce; 43= pound 44= quart (of gallon); 45= ton 46=gram; 47= decagram;

						48= hectogram; 49= kilogram;
						51=quart (weight);
						54=centiliter; 55= deciliter;
						56= liter; 57= cubic meter;
						58= parcel; 59=unit; 60= bottle;
						61= box; 62=drum; 63= can;
						64=bale; 65= carafe; 66= flask;
						67=small vial; 68= tube;
						69=dispenser; 70= package;
						71= load; 72= hundredweight;
						73=thousand; 74= tray;
						75=roll; 76= basket;
						77=plate; 78= form booklet;
						79= cone; 80= hank;
						81= pot; 82= drum; 83= block;
						84= tin; 85=glass; 86= page;
						87= piece; 88= ream;89= crate;
						90=sheet (paper); 91= pair;
						92=cardboard box;97=display; 98=sample; 99= strip;
						105= tied sugar loafs;
						106=pieces; 108= bag
cantidad_a	Quantity unit a	Numerical	Quantity of the base unit used in the distribution of the product ot item	Numerical	Must be included	Numerical value greater than 0
unidad_b	Unit b	Numerical	Code that identifies the second unit used in the distribution of the product or item	Numerical		Reported only if there is a value for unit_a.Takes the same value scheme
tipo_unidad_b	Dimension for unit b	Numerical	Dimension of the second unit used in the distribution of the product or item	Numerical		Reported only if there is a value for unit_a.Takes the same value scheme
cantidad_b	Quantity unit b	Numerical	Quantity of the second unit used in the distribution of the product ot item	Numerical		Reported only if there is a value for unit_a.Value greater than 0

Annex C. Table 4 C. D_QUOTATION_AAAA_MM (Continuation)

Denomination	Name	Field	Description	Value	Note	Rule
unidad_c	Unit c	Numerical	Code that identifies the third unit used in the distribution of the product or item	Numerical		Reported only if there is a value for unit_a and unit_b.Takes the same value scheme
tipo_unidad_c	Dimension for unit c	Numerical	Dimension of the third unit used in the distribution of the product or item	Numerical		Reported only if there is a value for unit_a and unit_b.Takes the same value scheme
cantidad_c	Quantity unit c	Numerical	Quantity of the third unit used in the distribution of the product ot item	Numerical		Reported only if there is a value for unit_a and unit_b.Value greater than 0
unidad_d	Unit d	Numerical	Code that identifies the fourth unit used in the distribution of the product or item	Numerical		Reported only if there is a value for unit_a and unit_b and unit_c.Takes the same value scheme
tipo_unidad_d	Dimension for unit d	Numerical	Dimension of the fourth unit used in the distribution of the product or item	Numerical		Reported only if there is a value for unit_a and unit_b and unit_c. Takes the same value scheme
cantidad_d	Quantity unit d	Numerical	Quantity of the fourth unit used in the distribution of the product ot item	Numerical		Reported only if there is a value for unit_a and unit_b and unit_c. Value greater than 0
novedadprod	Producer new event	Numerical	New event indicated by the source at the time of completing the form. It can not be modified by the analysts (locally or at the headquarters)	Numerical	Must be included	1 digit field 1= Actual 2=Discontinued 3=Replaced 4= Substitute 5=New 6= Temporarily out of production
precioant	Former price	Numerical	Price reported by the source in month previos to the month of reference	Numerical	Must be included	Value greater than 0
precioact	Actual price	Numerical	Current price of the product or item	Numerical	Must be included	Value greater than 0

Annex C. Table 4 C. D_QUOTATION_AAAA_MM (Final)

Denomination	Name	Field	Description	Value	Note	Rule
NOV_DANE	DANE new event	Numerical	New event indicated by the source and modified by of DANE staff at the stage of analysis	Numerical	Must be included	One digit value 1= Actual 2.=Discontinued (out) 3= Immediate substitution 4= Change of reference 5= New 6= Waiting period 7= Seasonal product
part.Arancelaria	Customs tariff code	Numerical	Code of customs tariff for imported or exported products according to the source	Numerical		Numeric code (10 digits)
Observa	Remark	Alfanu-merical	Remarks made by DANE sataff during the analysis	Text		