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Base December 2016=100

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National Institute of Statistics and Censuses (INDEC)

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Contents

1. Introduction

The Consumer Price Index (CPI) of the Republic of Argentina released since January 2017 measures changes in prices of a set of goods and services representing the consumption expenditure of urban households. The results are presented for the total country as a national index and for Cuyo, Greater Buenos Aires (GBA), North-East, North-West, Pampas and Patagonia as regional indices.

These statistics are produced by the National Institute of Statistics and Censuses (INDEC) in collaboration with the Provincial Statistics Offices (PSOs).

1.1 Uses of the CPI

The CPI provides information that is relevant for various reasons:

- It is used as a proxy for the country's inflation, thus it is considered in determining economic and monetary policies, contractual obligations, interest rates and remuneration.
- It serves as an indicator of changes in consumers' purchasing power.
- It is a useful tool to estimate economic series at constant prices.
- It provides a series of indices to compare changes in the prices of subsets of goods and services, providing information on different sectors of the economy.
- It shows the average change in prices of a set of goods and services on the market, representing the consumption of households.

1.2 Background

The first CPI was released in 1924 by the General Statistics Directorate for the Federal Capital of Buenos Aires. Since then, various revisions to the index have been performed: in 1933, 1943, 1960, 1974, 1988, 1999, 2008, 2013 and 2016. Modifications were introduced in each of these revisions in terms of reference population characteristics, selection of basket goods and services, price collection procedures and index calculation methods.

Regarding the reference population for the index, Table 1 shows its main characteristics for each index since 1933:

Table 1. Reference population of CPIs. 1933 to 2016

Base year of the index	Reference period of the household expenditure survey	Geographical area of the expenditure survey	Reference population of the CPI
Dec 2016	October 2004 to December 2005	Whole country with urban and rural coverage	All households resident in urban areas
Dec 2015	October 2004 to December 2005	Whole country with urban and rural coverage	All households resident in the geographical area of the Autonomous City of Buenos Aires and the 24 districts of Greater Buenos Aires
2013	March 2012 to March 2013	All households resident in districts of 5000 or more inhabitants	All households resident in the geographical area
2008	October 2004 to December 2005	Whole country with urban and rural coverage	All households resident in the geographical area of the Autonomous City of Buenos Aires and the 24 districts of Greater Buenos Aires
2005	February 1996 to January 1997	All households resident in districts of 5000 or more inhabitants	Autonomous City of Buenos Aires and provinces of Buenos Aires, Córdoba, Santa Fe, Mendoza, Tucumán, San Luis and Catamarca
1999	February 1996 to January 1997	All households resident in districts of 5000 or more inhabitants	Autonomous City of Buenos Aires and 24 districts of Greater Buenos Aires
1988	July 1985 to June 1986	Autonomous City of Buenos Aires and 19 districts of Greater Buenos Aires	Households with highest incomes (approximately 5% of the total) and single households were excluded
1974	October 1970 to September 1971	Autonomous City of Buenos Aires and 19 districts of Greater Buenos Aires	Only households with 2 to 7 members and a total income of $250 to $1500 (Argentine pesos, Law 18188) and the head of household employed in industry or trade
1960	January 1960 to December 1960	Autonomous City of Buenos Aires	Married couple with two children between 6 and 14 years of age. The only active member had to be the head of household, industrial worker and an income of $4500 to $8500 (national currency)
1943	May 1942 to June 1943	Autonomous City of Buenos Aires and surrounding suburbs	Married couple with 2 underage children, with the head of household employed as a non-qualified industrial worker
1933	October 1933	Autonomous City of Buenos Aires	Married couple with 3 children under 14, and the head of household employed as a worker with income of $115 to $135 (national currency)

Source: INDEC, Directorate of Consumer Price Indices.

In 2005, INDEC launched the *National Consumer Price Index - First Stage*, which included the following jurisdictions: Autonomous City of Buenos Aires and provinces of Buenos Aires, Córdoba, Santa Fe, Mendoza, Tucumán, San Luis and Catamarca. This programme also contemplated a plan to include the rest of the provinces, but it was discontinued in April 2008. In 2014, the *National Urban Price Index (IPCNu)* was launched, and then discontinued in 2015.

In December 2015, a process of price collection revision and analysis began, under an agreement with the PSOs, which enabled the development of the current CPI (base December 2016) as of January 2017.

2. Scope of the index

2.1 General concepts

Changes in household consumption expenditures can be divided into changes in the quantity or quality of goods and services, and changes in prices.

Volume indices measure the effect of changes in quantity or quality (product composition or components, operation features, durability, size, packaging, warranty, brand, prestige, etc.) and other price factors (outlet location, volume of sales or deliveries, payment options, etc.) at a given time.

Price indices seek to measure the effect of price factors, which are generally those which "identify the amount paid for one unit of a specified kind and quality of good or service obtained from a specified source by a specified population group."[1] Thus, price indices should not be affected by changes in the quality of goods and services.

The International Labor Organization (ILO) defines CPIs as index numbers that "measure changes in the prices of goods and services purchased or otherwise acquired by households, which households use directly, or indirectly, to satisfy their own needs and wants."[2]

From this definition, CPI's can be intended to measure changes in the amount that an average consumer spends to maintain a level of satisfaction, level of utility or standard of living, accepting, among other matters, that the consumer may constantly alternate between goods and services that provide the same satisfaction per expenditure unit.

Strictly speaking, the changes in the cost of living mentioned above do not only result from changes in the general level of prices, but also from changes in consumers' purchasing patterns. For this reason, the calculation of cost of living indices (COLIs) presents considerable practical difficulties, and there have been few attempts to include them in official statistics. Countries mostly calculate the CPI as the percentage change in the prices of a fixed basket of goods and services.

[1] Hurwitz (1962, p. 815).
[2] ILO et al. (2004, p. 1).

In order to analyse pure price development in a pure manner, the weights of goods and services must be the same in the compared periods and, at the same time, the specifications of the basket goods and services must be comparable.[3]

As shown below, measuring pure price changes is not an easy task, since the practical application of these principles inevitably faces some issues resulting from both the lack of constancy of various physical volume factors and the difficulties in obtaining the basic information to evaluate them.

Hereafter, the term "CPI" will only be used to refer to the index measured with a fixed basket, in order to distinguish it from the COLI.

2.2 Household consumption expenditure

The System of National Accounts[4] (SNA) defines final consumption goods or services as those which are used by households, non-profit institutions serving households (NPISH) or government units for the direct satisfaction of individual needs or wants, or the collective needs of the members of a community.

Part of these consumption goods and services are those which satisfy the individual needs or wants of each household, obtained a) by acquisition, b) from own production, c) as payment, or d) as a free good or service provided by the State. In the SNA, the expenditure incurred by households for individual consumption goods and services is called "final consumption expenditure of households", and it includes goods and services (a), (b) and (c). When we include goods and services (d), we obtain the "actual consumption" of households.

Expenditures which are not considered consumption expenditures are taxes; retirement deductions; loan or debt payments; donations or transfers to other households or to non-profit institutions; and other cash output attributable to physical or financial investment of the household (home purchase, payments to purchase communities, debt amortization, stock purchase, bank deposits, etc.).

In principle, final consumption expenditure of households could be defined in terms of the value of the goods and services acquired, paid or used by households during a certain period for the satisfaction of their needs or wants. In accordance with the recommendations of the SNA and usual practice for household budget surveys, the acquisition at cash price criterion was applied to the ENGHo 2004/05.

Consumption expenditure comprises the value of the consumption goods and services acquired by households during a certain period, regardless of whether the goods and services have been paid for or used in the same period or at a later time. This criterion is applied also to durable goods (motor cars, televisions, etc.), considering that they are acquired when they are made available to the household, regardless of their useful life.

[3] Hill (1997).
[4] European Commission, IMF, OECD, UN and WB (2016).

Unlike the national accounts consumption basket, the CPI basket excludes the imputed rental of owner-occupied dwellings and the imputed value for use of financial intermediation services indirectly measured (FISIM).

Additionally, (bank and non-bank) interest charges comprise property income payments and are excluded both from consumption expenditure (when calculating weights) and from the prices used to calculate the CPI.

Table 2. **Inclusions/exclusions in consumption expenditures used to calculate the CPI**

Included	Excluded
• Value of goods and services received as payment for the work of household members • Value of goods and services obtained in own production of the household or from an own business for household consumption	• Non-consumption goods and services: taxes, retirement deductions, loan or debt payments, donations or transfers to other households or to non-profit institutions, etc. • Physical or financial investment of the household: home purchases, payments to purchase communities, debt amortisation, stock purchases, bank deposits, etc. • Imputed value for housing services provided by dwellings used by their owners. • Bank and non-bank interest charges.

Source: INDEC, Directorate of Consumer Price Indices.

2.3 CPI goods and services basket

The set of consumption goods and services which undergo price collection for the calculation of the CPI constitutes the basket of the index.

Producing this basket entails classifying the consumption goods and services, selecting those which are representative for the analysis of consumer price developments, and assigning weights to each of them.

The relevance of each goods and services grouping is obtained from household surveys. The results used for the CPI base December 2016 are from the ENGHo period October 2004-December 2005.

Until the CPI-GBA base December 2015=100, the basket was classified into nine main breakdown levels.

For the current CPI, INDEC has adopted the 1999 United Nations Classification of Individual Consumption According to Purpose (COICOP). This classification is the international standard, recommended by the ILO and the OECD, which uses it for the harmonised dissemination of the consumer price statistics of its member countries.

The COICOP[5] has a first disaggregation level comprised by 12 divisions, presented below.

Table 3. First classification level of the CPI basket

01-	Food and non-alcoholic beverages
02-	Alcoholic beverages and tobacco
03-	Clothing and footwear
04-	Housing, water, electricity, gas and other fuels
05-	Household equipment and maintenance
06-	Health
07-	Transport
08-	Communication
09-	Recreation and culture
10-	Education
11-	Restaurants and hotels
12-	Miscellaneous goods and services

Note: The names in this version correspond to the COICOP Argentina and differ slightly from the international COICOP but are conceptually equivalent. For more details on weights, see Annex I.

Source: INDEC, Directorate of Consumer Price Indices.

Breakdown at lower levels is adjusted to the Argentine adaptation by groupings of goods and services to allow for greater accuracy in price analysis. Therefore, it includes division, group, class, subclass, product and variety for each region.[6] For example, Table 4 presents the basket breakdown for the CPI classification for each region.

Table 4. Breakdown of the basket in each region

Code	Level	Example
00	General level	General level CPI
01	Division	Food and non-alcoholic beverages
01.1	Group	Food
01.1.1	Class	Bread and cereals
01.1.1.1	Subclass	Bakery and pastry products
01.1.1.1.01	Product	Pastries and churros
01.1.1.1.01.01	Variety	Pastries

Source: INDEC, Directorate of Consumer Price Indices.

[5] COICOP (1999).

[7] The COICOP Argentina nomenclature (2019) presents breakdown up to product. For the purposes of the CPI, a further breakdown level, the variety, was added to more precisely group the goods and services collected. They can be consulted at: https://www.indec.gob.ar/ftp/cuadros/menusuperior/clasificadores/coicop_argentina_2019.pdf.

Diagram 1. **Main CPI levels of the COICOP Argentina classification**

- **1. Food and non-alcoholic beverages**
  - Food
    - Bread and cereals
    - Meat and meat products
    - Milk, dairy produce and eggs
    - Oils, fats and butter
    - Fruit
    - Vegetables, tubers and beans
    - Sugar, confectionery, chocolate, etc.
  - Non-alcoholic beverages
    - Coffee, tea, mate and cocoa
    - Mineral water, soft drinks and juices
- **2. Alcoholic beverages and tobacco**
  - Alcoholic beverages
  - Tobacco
- **3. Clothing and footwear**
  - Clothing and materials
  - Footwear
- **4. Housing, water, electricity and other fuels**
  - Rentals for housing and related expenses
    - Rentals for housing
  - Electricity, gas and other fuels
- **5. Household equipment and maintenance**
  - Goods and services for household maintenance
- **6. Health**
  - Medical products, appliances and equipment
  - Healthcare and health insurance expenses
- **7. Transport**
  - Purchase of vehicles
  - Operation of personal transport equipment
    - Fuel and lubricants of household vehicles
  - Public transport
- **8. Communication**
  - Telephone and internet services
- **9. Recreation and culture**
  - Recreation and culture services
  - Newspapers, journals, magazines, books and stationery
- **10. Education**
- **11. Restaurants and hotels**
  - Restaurants and food outside the home
- **12. Miscellaneous goods and services**
  - Personal care

2.4 Definition of variety

Within the structure for the CPI basket, the variety is the smallest grouping with an assigned weight. To identify the goods or services in each of these varieties, there is a description of each variety, the "specification", and a description of variable characteristics, the "attributes". That is, within the variety there are several goods or services, **"items"**, with the same specification and different attributes, whose prices are observed at different outlets.

The level of detail with which the specification for a price-collection variety is defined depends on the possibility of finding suppliers of the goods and services, as well as the level of uniformity of its physical and functional features and price volatility.

Specifications can be classified as:

- Closed, when the goods and services that belong to that variety have equivalent characteristics.

- Open, when there are differences in the goods and services of a variety and a generic description is required to increase the chances of finding those goods and services at the outlet.

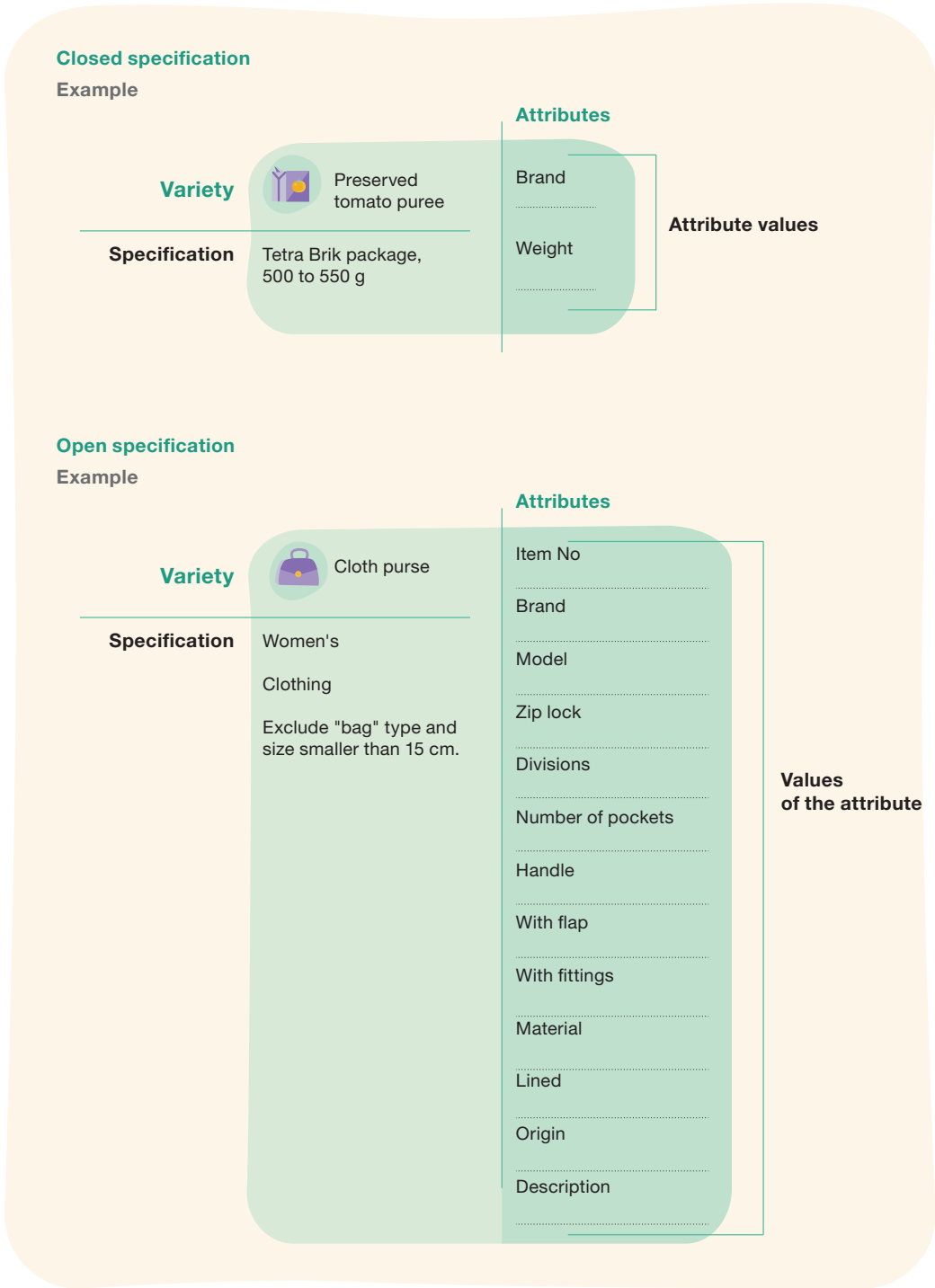
Furthermore, attributes help identify the item that will undergo price collection. In each outlet, the price collector begins by taking note of the attributes. This allows for follow-up of the same item.

Attributes can be classified as logical, numerical and text. Some examples are brand, weight, colour and barcode.

Two examples of varieties with closed and open specifications are presented below:[7]

[7] The examples are for illustration purposes. The CPI basket good or service may vary significantly from the example.

Diagram 2. **Example of varieties with closed and open specifications**



2.5 Reference population

The reference population is the group of households whose consumption expenditure is taken into account to calculate CPI weights.

In the CPI base December 2016, the reference population corresponds to the private households in the country's urban areas.

Indices are calculated for the national total and six statistical regions: Greater Buenos Aires, Cuyo, North-East, North-West, Pampas and Patagonia.

2.6 Geographical coverage of the price collection

The national coverage of the index entails a nationwide price collection. Provincial and regional representation was considered for the selection of agglomerations and districts. First, agglomerations were organised in decreasing order of population size by province, according to the results of the 2010 National Population Census. Then, the required number of agglomerations was included in each province to equate the sample's population share to the original share of each province in its regional total.

This process determined a geographical coverage for the collection of 39 urban agglomerations/simple districts, including all province capitals and other large population districts.

Table 5. **Agglomerations included in the price collection, by region**

Region	Agglomerations/districts
Cuyo	Greater Mendoza, San Juan, San Luis and San Rafael
Greater Buenos Aires	Autonomous City of Buenos Aires and 24 districts of Greater Buenos Aires
North-East	Corrientes, Formosa, Posadas, Presidencia Roque Sáenz Peña and Resistencia
North-West	San Fernando del Valle de Catamarca, La Rioja, San Ramón de la Nueva Orán, Salta, San Miguel de Tucumán, San Salvador de Jujuy and Santiago del Estero
Pampas	Bahía Blanca, Concordia, Córdoba, Greater La Plata, Mar del Plata, Paraná, Rafaela, Río Cuarto, Greater Rosario, Greater Santa Fe, Santa Rosa, Tandil, Villa María and Zárate
Patagonia	San Carlos de Bariloche, Comodoro Rivadavia, Neuquén, Puerto Madryn, Río Gallegos, Río Grande, Trelew, Ushuaia and Viedma

Source: INDEC, Directorate of Consumer Price Indices.

3. Samples and collection structure

3.1 Selection of a sample of outlets

For the selection of outlets and of goods and services, due to the lack of information to obtain probability samples (the country does not have an updated register of economic units), the basis was a set of respondents available up to December 2015 to adapt the sample to the distribution of expenditure by type of business (traditional and supermarkets) estimated from the ENGHo 2004/05, and to expand and improve representativeness in different outlets. As a result of the adjustments, in July 2017 the number of respondents was 500 supermarkets and over 16,200 traditional businesses.

3.2 Selection of goods and services

On the basis of the ENGHo 2004/05, the procedure used to define each regional basket and its corresponding weights sought to maximise the use of the varieties collected up to December 2015.

Although there was a definition and identification of varieties to collect prices in December 2015, a revision of each variety was necessary to a) correct deficiencies in the quality control of the data obtained by price collectors, and b) update specifications according to current commercial presentations.

3.3 Price selection and collection

In each agglomeration, price observation is performed for a sample of respondents distributed throughout the month, in 20 business days, called panels. That is, each panel is assigned a day of the month, a fixed set of respondents, and a group of price collectors.

Prices are collected in outlets classified into traditional businesses (for example, bakeries and butcher shops), supermarkets, and institutions and enterprises (for example, schools and gas companies). Prices are also centrally collected by phone, email, websites and publications.

Traditional businesses are visited once a month and supermarkets are visited twice a month, approximately 10 panels apart. The number of prices observed monthly is over 320,000. For tariffs and information provided by enterprises, prices are collected during the entire month.

Items that undergo price collection must meet the following conditions: (i) be observable and comparable over time, (ii) represent consumption for that variety, and (iii) be available at the time of visit.

The selection of items takes place in the initial implementation stage of the CPI, once the varieties have been selected and their specifications have been defined. At each point of sale, collectors look for the best-selling item that meets the specifications and conditions mentioned above. Price collectors may determine which items are sold the most by consulting the respondent or by simply observing the stock available on the shelves. During the following months, the collector must look for the same good or service, observing the attributes detailed during the first visit and that allow unequivocal identification (See below for unavailable prices and changes in quality.).

Prices are collected using paper forms, adapted to each type of outlet. Each PSO is responsible for entering the collected data in the computer system. Once the data have been entered, there is a quality control process using different tools that allow correction of errors during collection or entry:

- History of price development for a specific respondent.
- Differences with the price average for the agglomeration, region or total country.
- Maximum and minimum values for the region.
- Comparisons with prices of the same supermarket or hypermarket chain.
- Comparison with prices of the same brand.

Price analysis at the agglomeration level is done in collaboration with each PSO, while regional and national analysis is only done by INDEC.

No collected price is excluded beforehand. When there are differences between the collected price and observations using the aforementioned analysis, the first step is to rule out entry errors by comparing the data in the system with the collection form. If the error is not in the entry, either a supervisor or the same collector performs a new field observation. In general, the new observation is done a few days after the original collection, which can lead to price variation. If both the correct item and the initially collected item are found (for example, because the collector mistook some attribute), the supervisor performs a correction. If both items are not available during supervision, the collector's price is maintained. If the collection error is evident and confirmed by the collector, the price is omitted for the month and imputed as an unavailable price (See Section 7.1.).

4. CPI calculation

It is important to differentiate the reference periods in the CPI calculation: 1) weights, 2) prices, and 3) index.

The reference period for the weights is related to the expenditure survey used for its calculation. For the CPI base December 2016=100, the period is October 2004 to December 2005. A new expenditure survey would allow updating the structure of weights and the goods and services basket.

The base period for prices is December 2015 and, therefore, the weight structure was updated by the price performance from 2004/05 to December 2015.

The reference period for the index indicates when the index is rescaled to 100. In this case, the reference period for the index is December 2016.

4.1 General concepts

A price index measures percentage changes for a set of prices referring to a certain period, in order to observe their variation over time.

The Laspeyres price index is a fixed price index of a basket of goods and services defined in a previous period (period 0), called "base", which is to be analysed (period t). It is calculated as:

$$I_t = \frac{\sum_{i=1}^{n} p_i^t q_i^0}{\sum_{i=1}^{n} p_i^0 q_i^0} \qquad (1)$$

Where:

p_i^t = price of good or service i, in period t,
p_i^0 = price of good or service i, in period 0,
q_i^0 = quantity of good or service i, in period 0,
n = total goods or services included in the index.

This formula is usually modified to facilitate its implementation:

$$I_t = \frac{\sum_{i=1}^{n} p_i^t \frac{p_i^o}{p_i^o} q_i^0}{\sum_{i=1}^{n} p_i^0 q_i^0} = \frac{\sum_{i=1}^{n} p_i^o q_i^0 \frac{p_i^t}{p_i^o}}{\sum_{i=1}^{n} p_i^0 q_i^0} = \sum_{i=1}^{n} w_i^o \frac{p_i^t}{p_i^o} \qquad (2)$$

Where the weight of the good or service *i* included in the CPI basket, w_i^o, is:

$$w_i^o = \frac{p_i^o q_i^o}{\sum_{i=1}^{n} p_i^o q_i^o} \quad (3)$$

The recommendation is that these weights be updated at certain intervals (on average, every five years) taking into account household expenditure surveys or national accounts estimates on the composition of final consumption of households.

Therefore, the CPI is a weighted average of price changes of the goods and services included in the index basket. To this end, the weights must reflect the relative importance of the good or service in terms of its participation in the estimated expenditure of the reference population (Formula 2).

Finally, the index variation measures the percentage change in its value between two periods and is calculated as follows:

$$\Delta_{t,t-1} = \frac{I_t - I_{t-1}}{I_{t-1}} * 100 \quad (4)$$

4.2 Structure of weights and updating by prices

As mentioned in the previous section, weights reflect the relative importance of goods and services in the average expenditure of households and, therefore, are built from an expenditure survey.

In particular, the weights of the CPI base December 2016=100 are estimated on the basis of the expenditure of urban households in the ENGHo 2004/05 by region and the varieties collected in December 2015. First, the average expenditure of households per variety was estimated, and so the weight structure was constructed, with expenditures of 2004/05 (reference period of the original weights) and the selection of goods and services consumed in December 2015.

It is worth noting that the use of the Laspeyres formula for calculating the CPI implies that the reference period for the weights is the same as the reference period or base for prices. Since household surveys (normally in field stage during a year) are time-consuming, there is usually a delay before the results can be used for the CPI.

Updating the weights to the reference period of the price base would require knowledge of the changes in quantities and prices of all goods and services consumed. Since it is extremely difficult to estimate in detail the development of consumed quantities, the recommendation is to perform (at least) one adjustment by price development.

Thus, CPI weights are hybrids: quantities of the reference period from household expenditure surveys and mean prices of the base period of the index.

To update weights, the CPI-GBA 1999 base varieties, released until December 2006, were matched with the CPI-GBA varieties collected in December 2015, analysing in detail the specifications of each variety in the basket for each index. In this way, the only price relatives considered were those corresponding to varieties with specifications that were considered to be similar. These relatives were used for all regions.

In the specific case of water, gas and electricity charges, the same matching task was done at the regional level, calculating the corresponding adjustment between provincial rate sheets in force up to 2005 and those in force up to December 2015.

Finally, once the set of weights for the basket of the new index was updated up to December 2015, some adjustments were made based on invoicing and consumption data. One example is the adjustment made for telephone services. According to the 2004/05 ENGHo, households spent more on fixed phone service than on mobile phone service. In the same way, the expenditure associated to home internet service was adjusted. In order to correct these distortions that could reflect an outdated expenditure structure, there was a reweighting of fixed and mobile phone and home internet, keeping the total expenditure share of these three services estimated from the ENGHo 2004/05 updated, but redistributing each individual weight by invoicing:

$$w_i^* = \sum_{i=1}^{3} \mathrm{w}_\mathrm{i}^{\mathrm{D15}} * \frac{F_i}{\sum_i^3 F_i} \quad , \qquad (5)$$

Where:

i= 1: landline phone services, 2: mobile phone services, and 3: home internet services,

$\mathrm{w}_\mathrm{i}^{\mathrm{D15}}$= weight updated to December 2015, estimated from ENGHo 2004/05 of service *i*,

F_i = service invoicing *i* to December 2015.

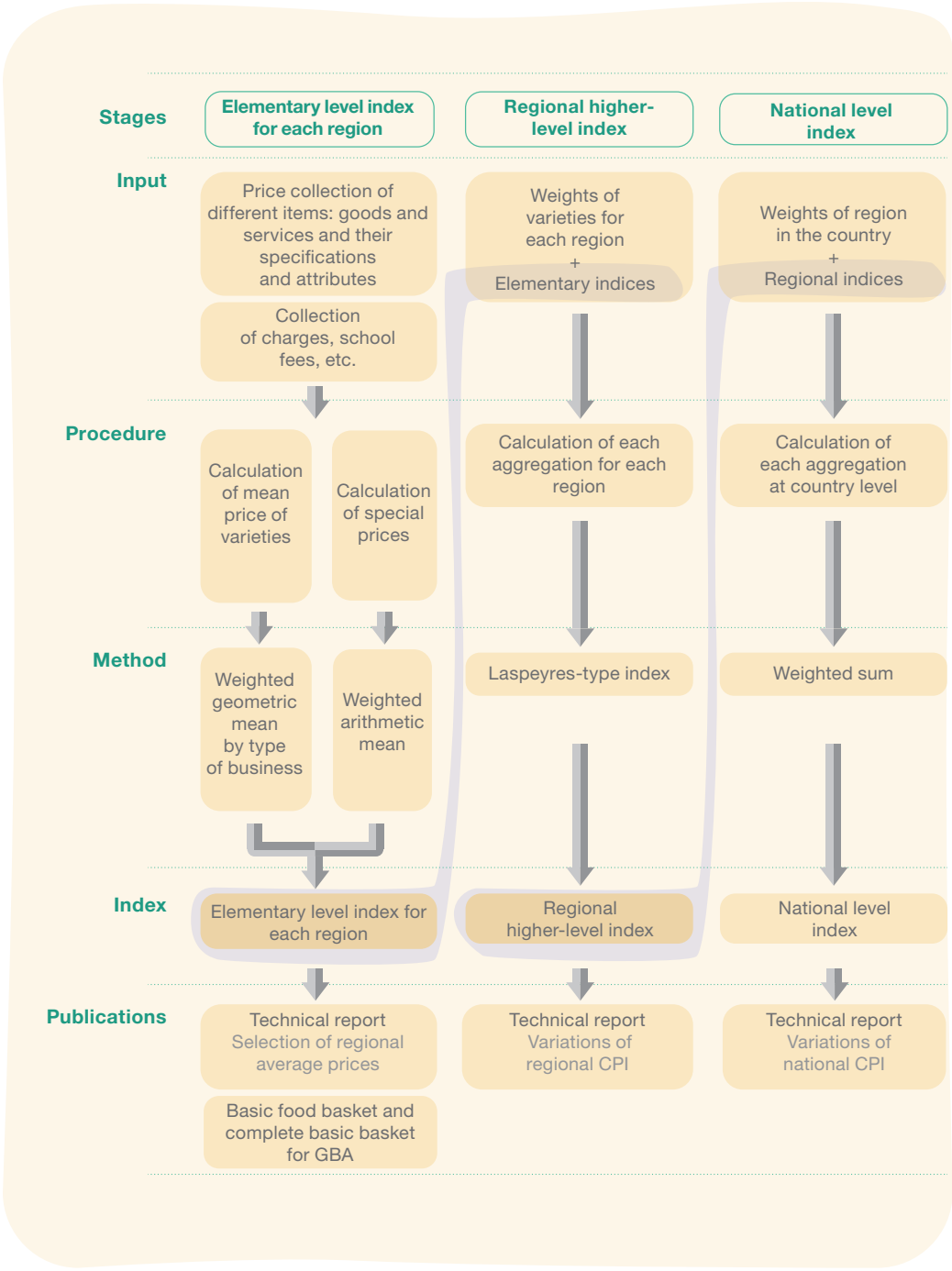
Since there are very few companies providing these services and they tend to offer all of them, the information used was the invoicing of companies associated with each service to reassign the aggregated expenditure weight of the phone service to each specific service.

5. CPI calculation stages

The CPI is calculated in three stages. The first stage is the calculation, for each region, of the lower-level indices, called “elementary indices”. The second stage is the calculation of the higher levels of each region, by aggregating the weighted sum of the elementary indices in order to obtain different categories, such as division, group, class, regulated goods and services. The third stage is the construction of the CPI with national coverage, by weighted sum of regional indices.

The following figure shows the different calculation stages:

Diagram 3. **Calculation stages**



5.1 Calculation of elementary indices

During the first stage of the CPI calculation, the lower-level indices are calculated for each region from the average prices of each variety.

Before being used for the CPI, each price observation is submitted to a **normalisation** process, i.e. its calculation unit is standardised since, for example, prices of items of a same variety may be expressed in some outlets in kilograms, and in others in grams or dozens.

The average price of a variety is the **simple geometric mean** of –collected or imputed– prices of items of that variety included in the sample in a certain month in a region.

In the case of supermarkets, which are visited twice a month, an arithmetic mean is first calculated of the positive prices observed during the month.

$$\bar{P}_{i,\mathrm{j}} = \frac{p_{i,j}^{1} + p_{i,j}^{2}}{2} \qquad (6)$$

Being:

i = item
j = respondent

Then, there are two calculations for each region, one for supermarkets and another for the rest of the respondents, without weights, using the following formula:

$$\bar{P}_{g,v} = \prod_{i=1}^{n_g} (p_{g,v,i})^{\frac{1}{n_g}} \qquad (7)$$

Where:

v = variety of good or service
g = type of business (supermarket or traditional business)
ng = number of respondent businesses in the type of business g

Lastly, when the prices of the items are observed both in supermarkets, s, and in traditional stores, c, the average price for the variety is calculated from the mean geometric prices $\bar{P}_{c,v}$ and $\bar{P}_{s,v}$ previously calculated, weighted by the fixed share obtained from the ENGHo 2004/05 from purchasing patterns in each type of business:

$$\bar{P}_{v} = (\bar{P}_{c,v})^{\alpha_{\mathrm{c}}} * \left(\bar{P}_{s,v}\right)^{\alpha_{\mathrm{s}}} \qquad (8)$$

$$\text{con } \alpha_{\mathrm{c}} + \alpha_{\mathrm{s}} = 1$$

Where:

α_S= share of supermarkets, s in each region,
α_C= share of traditional businesses, c in each region.

The **price relative** $R_{v,r}^{t-1,t}$ between periods t and t-1 is the average price ratio of the variety, v, in the region, r:

$$R_{v,r}^{t-1,t} = \frac{\bar{P}_{v,r}^{t}}{\bar{P}_{v,r}^{t-1}} \qquad (9)$$

The **elementary indices** are the smallest level of disaggregation of the CPI and are calculated for each region from the average relative prices between different periods. Therefore, the elementary price index for a variety v, in region r, in month t, regarding base 0 is calculated using the following formula:

$$I_{v,r}^{0,t} = R_{v,r}^{0,1} * R_{v,r}^{1,2} * \ldots * R_{v,r}^{t-1,t} * 100 \qquad (10)$$

5.2 Calculation of higher-level indices

Higher-level indices are aggregations of the elementary indices (for example, division, group, class).[8] For each aggregation, the index is calculated by weighted sum of the elementary indices (Laspeyres-type index).

Therefore, the index of aggregation A, in region r, in month t is:

$$I_{A,r}^{0,t} = \sum_{v \epsilon A} w_{v,r}\, I_{v,r}^{0,t} \qquad (11)$$

Where:

$I_{v,r}^{0,t}$= elementary index of variety v, of region r, in month t regarding base,

$w_{v,r}$= weight of variety v, of region r, in base month defined by:

$$w_{v,r} = \frac{g_{v,r}}{\sum_{i \epsilon A} g_{i,r}} \qquad (12)$$

where $\sum_{v \epsilon A} w_{v,r} = 1$

$g_{v,r}$= household final consumption expenditure for variety v, in region r estimated from ENGHo 2004/05 updated until base month,

$g_{i,r}$= household final consumption expenditure for variety i, included in aggregation A, of region r estimated from ENGHo 2004/05 updated until base month.

The highest level of aggregation for each region r is the general level index I_r^t a result of applying the Laspeyres formula to n varieties collected in the region. Therefore, for each region, in each month, the general level of the index is calculated as follows:

[8] In addition to the higher levels of the index, there are other groupings of elementary indices that are of particular interest, for example, goods and services or the regulated, core and seasonal categories. For these groupings, the same formula as the higher-level indices is applied

$$I_r^t = \sum_{v=1}^{n} w_{v,r}\, I_{v,r}^{0,t} \qquad (13)$$

Where:

$I_{v,r}^{0,t}$= elementary index for variety v, in region r, in month t, regarding the base.

5.3 Calculating the national level index

Finally, the general level of the CPI with national coverage is calculated as the weighted sum of the regional indices, the weights being the total expenditure rates of the different regions compared to the total expenditure of the country, estimated from the ENGHo 2004/05 (See Table 6), as follows:

$$I_{NG} = \sum_{r=1}^{6} w_r * I_r \qquad (14)$$

Where:

w_r= weight of region r in the total country as per Table 6,
I_r= general level index for region r.

Table 6. **Percentage share of each region in the consumption expenditure of households, compared to the national total**

Geographic region	Weight
National total	1.000
GBA	0.447
Pampas	0.342
North-East	0.045
North-West	0.069
Cuyo	0.052
Patagonia	0.046

Source: INDEC, Directorate of Consumer Price Indices.

In particular, the different aggregation levels of the national index I_A are obtained by formula:

$$I_A = \sum_{r=1}^{6} w_r * I_{A,r} \qquad (15)$$

Where:

w_r= weight of region r in the total country as per Table 6,
$I_{A,r}$= aggregation index A, in region r

6. Incidence and bandwagon effect

In a certain month t, the **incidence** of a grouping A on the general level of the index is equal to the percentage points that the general level of the index would have increased by if all other indices had remained constant. This concept, that is released monthly, is calculated as:

$$Incidence_A^{t,t-1} = \frac{(I_A^t - I_A^{t-1})w_A}{I_{NG}^{t-1}} \qquad (16)$$

Where:

I_A^t= index of grouping A in month t,
I_A^{t-1}= index of grouping A in month t-1,
I_{NG}^{t-1}= general level index in month t-1,
w_A weight of grouping A.

The algebraic sum of all incidences is verified to equal the monthly variation of the general level of the CPI.

The **bandwagon effect** is related to the fact that prices are collected every business day of the month for each variety. Given that the index is calculated by comparing mean prices of consecutive months, if prices rise in the last days of the month, the effect will be more noticeable in the following month than in the month measured. The variation of the index in a certain month compared with the previous month, caused by differences in the days in which prices are effective, is called the bandwagon effect of the index. Thus, for example, in the first month, a “high” price may be in effect for a few days, while in the second month it will be in effect since the beginning, which is why the increase will have a higher effect in the latter month.

7. Special aspects in the treatment of prices

7.1 Unavailable prices

At different points during the month some prices may not be available due to temporary lack of stock, temporal unavailability of the service, or non-permanent absence of the respondent. In these cases, the item is not collected during that month. When the month ends, and before calculating the average price for the variety, non-collected prices are completed with the imputation method.

When some respondents do not have prices for a variety, prices are imputed by variation of other prices of the same variety which were collected. If the number of collected prices is insufficient, the imputation is performed with the immediate higher level (for example, product).

Price imputation of non-observed prices in a month are performed by extrapolation of the last observed price, using one of the following procedures:

i. If the number of valid prices is higher than the 50% required for that variety, the unavailable prices are calculated from their last monthly value, applying the average variation observed in the businesses which informed prices for that variety.

ii. If the number of valid prices is within the 20% and 50% required for that variety, the unavailable prices are calculated from their value in the previous month, applying the average variation observed in the prices of the other varieties of the immediate higher grouping.

iii. If the number of valid prices is less than the 20% required for that variety, these prices are discarded, applying to all prices of the previous month the average variation observed in the prices of the other varieties of the immediate higher grouping.

In the particular case of temporarily unavailable prices of **seasonal** goods and services, for instance fruits, vegetables and clothing, the treatment of these prices is the same as for other prices, and the imputation method is applied. This method is called the fixed weights approach[9] and is one of the internationally accepted methods.

7.2 Quality adjustment methods

There are several methods to perform quality adjustment. The methods used for each item[10] depend on the availability of a replacement, on whether there has been a change in quality, and on the possibility of quantifying the differences in quality.

When there is a replacement available in the market of the same quality as the item which was being collected, a direct replacement is performed, modifying the collected attributes without quality adjustment.

When there is a replacement available but with changes in quality, i.e. there are no other items with the same specification, the good or service may be available with some quality differences or may not be available. If the good or service is still available, price collectors and analysts observe the characteristics of the potential replacements, trying to identify differences in quality and in relation to the price. Differences in quality may be quantifiable, and an explicit adjustment is made (quantity adjustment and comparable replacement methods) based on the information available and the analysis performed. If the differences in quality are non-quantifiable, implicit quality adjustments are performed (overall imputation or linking).

[9] UN, UNECE, WLO, IMF, OECD, Eurostat, WB and ONS-UK (2009).
[10] If not just the item but the variety is unavailable, then the same procedure as for the item is applied. The same procedure applies, but for the variety instead of the item.

Each method is described below:

1) Explicit quality adjustment methods

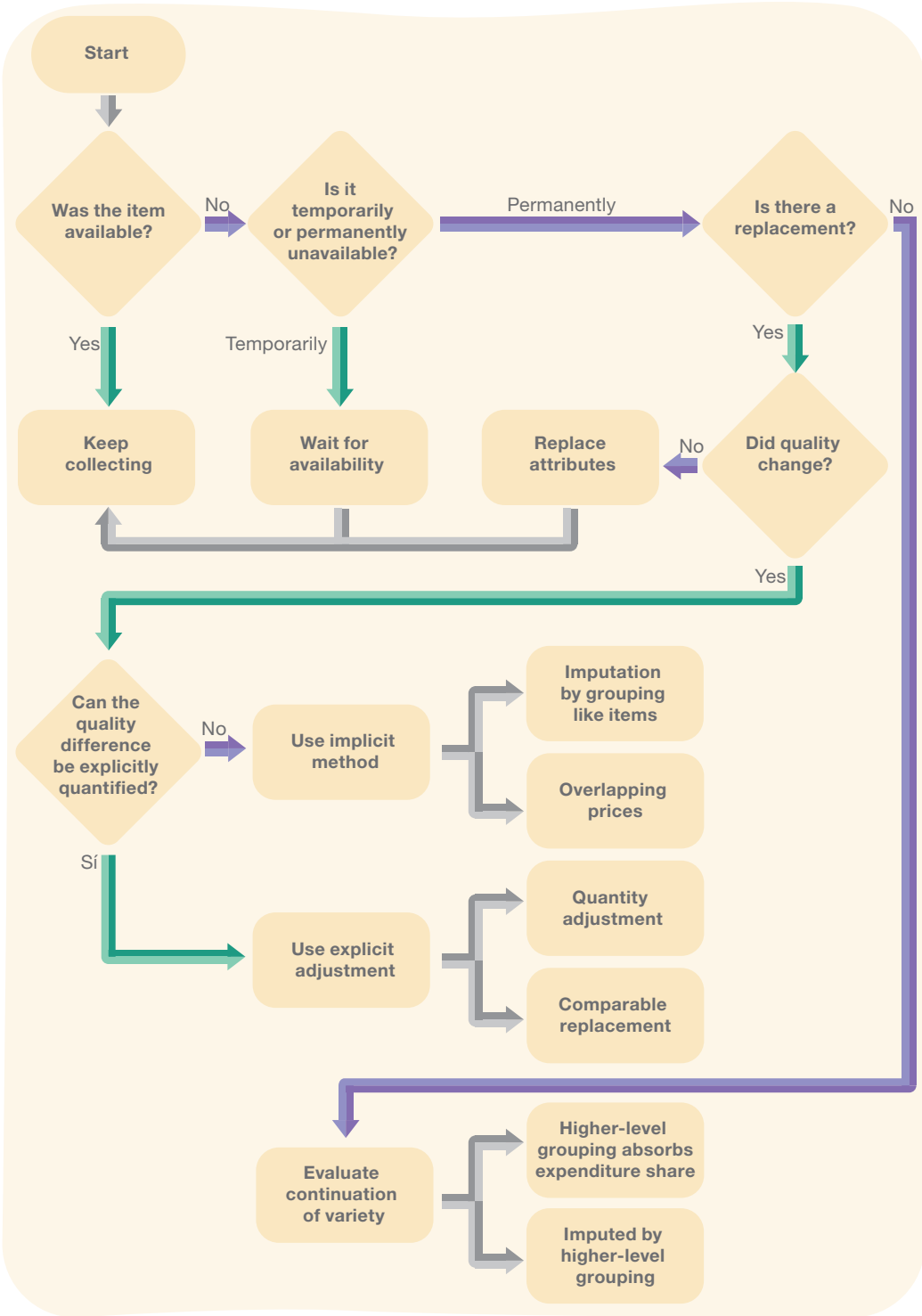
a. Quantity adjustment: The item generally has the same specification, except for some characteristic that can be easily quantified, such as weight, size, or number in units. In this case, analysts select an item to replace the unavailable item and a standard adjustment is made.
b. Comparable replacement: the replacement item is considered to have similar quality to the unavailable item. The replacement is direct, under the assumption that the price difference is not due to quality changes, even if the items are different.

2) Implicit quality adjustments

a. Imputation by grouping like items: Indirect quality adjustment method. The item that is no longer collected is imputed by another collected item grouping (See Section 7.1.). This method assumes that the variation of an unavailable item will have the same performance as the collected items.
b. Overlapping prices method: It is a type of implicit quality adjustment in which, during at least two months, an item and its possible replacement are simultaneously collected. When the time comes, the variation in the disappearing good or service is imputed by the variation of the new item. This implicit method assumes that the price variation of both goods and services is similar.

Although the good or service has completely disappeared from the market, continuation of the variety must be evaluated until the next expenditure survey to redefine the basket. In this case, depending on the relation of the variety to be replaced with the rest of the varieties collected, its weight is distributed to the higher-level grouping or the variety is maintained but imputed by the grouping that includes it.

Diagram 4. **Quality adjustment methods**



8. Treatment of regulated utilities and composite prices

There is a group of prices (regulated and composite prices) that are obtained by consulting fee schedules or information provided by regulatory bodies and other institutions, or by phone, email or the internet. These are centrally collected prices.

Tariffs of utilities are estimated from updated information provided by regulatory entities and enterprises. The estimation includes the necessary adjustments to reflect differential tariffs when consumption patterns might be collected. In general, for practical reasons, discounts available only to certain groups of households are not considered for the CPI, since they are not available to the whole population (discriminatory), nor are the expenditures usually known in the base period. However, when discounts are significant and available to identifiable subgroups of the reference population who qualify for these subsidised tariffs based on demographic characteristics or other characteristics that do not imply any action on the part of the beneficiary, they should be included in the CPI. This justifies taking into account, for example, concessionary gas and electricity rates or, in the case of transportation in GBA, multimode fares. Additionally, in the case of gas and electricity services, there were data on users that unequivocally qualified for concessionary rates.[11] For public transportation in GBA, the Ministry of Transport provided access –through the SUBE– to data on total train, bus and underground journeys during a normal operation working day (around 13 million records).[12]

On the other hand, tariff changes in electricity, gas, transport and phone services are considered since they come into force and on an accrual basis, regardless of their billing cycle. The next section provides details on the calculation methods for each service.

8.1 Electricity and town gas

The information for calculating electricity and town gas is obtained from official resolutions and fee schedules issued by service providers or regulatory bodies to the main companies in each agglomeration included in the CPI price collection.

For each fee schedule and type of tariff in force, a sole vector of monthly average consumption (kw/h and m^3 for electricity and gas, respectively) was created, including all consumption ranges detailed in the available fee schedules to December 2015 in all the country.

[11] In the specific case of GBA, the treatment of tariff utilities is detailed in *Methodology No 19*. This document presents only the guidelines common to all regions.

[12] This record allowed the identification of the integration stages of each journey and means of transport used be each user in each section of the journey, as well as the social attribute (full and concessionary rate) under the new integrated ticket system. (Explanatory notes of February 2018 report).

For each agglomeration and type of fee in force during each month (regular and concessionary or subsidised, as applicable) a rate per consumption level of the vector in question is calculated. The calculation considers escalation of variable cost, as applicable.[13]

To produce the regional indices, the following procedures are performed:

1. Calculation of average bill by agglomeration: It results from the self-weighted geometric mean of bills calculated for each consumption level in each month.

2. Calculation of the elementary index by agglomeration: The average bills were converted to index numbers, with base month December 2015.

3. Calculation of provincial indices: They result from the self-weighted arithmetic average of the agglomeration indices in each province.

4. Calculation of the regional index: It results from the weighted arithmetic mean of the provincial indices. For the electricity service, the weight corresponds with the number of users per province registered in 2015, according to the Ministry of Energy and Mining. In the case of town gas, the weight corresponds to the number of users per province registered in 2015, according to the National Gas Regulating Agency (ENARGAS, in Spanish).

8.2 Water supply and sewage services

The information for calculating water supply and sewage services is obtained from official resolutions and fee schedules issued by service providers or regulatory bodies for to the main companies in each agglomeration included in the CPI price collection.

Since the charging methods for this service are heterogeneous, only one value per agglomeration is identified, which allows for the calculation of price variations for the service (usually not metered). These values may be coefficient *k*, value of reference bill, single tax coefficient, etc.

For each agglomeration, the index with base December 2015 is calculated. Then, the indices are aggregated at the provincial level, performing the unweighted arithmetic mean of the agglomeration indices. For the regional level, the weighted sum is calculated by population with water supply service of the provincial indices. The weights were obtained from the National Population, Households and Housing Census 2010, considering the population by province with network water.

[13] Having a fixed consumption vector constant over time helps guarantee that registered variations in average bills answer only to changes in prices, compared to changes registered in fee schedules structures (quantity and extent of ranges).

8.3 Fixed phone service

To estimate the performance of the fixed phone service, the following concepts, exclusively related to phone service, were considered:

- charge
- urban calls to fixed telephones
- urban calls to mobile phones
- inter-urban calls
- international calls

The index for "fixed residential phone service" is the result of a weighted average of indices for each of the included concepts, described below.

For the Charge concept, an average price is estimated, $C1$, as the geometric mean of the charge value of the general house line plus taxes, informed by the n companies.

$$C_1 = \sqrt[n]{\prod_{e=1}^{n} A_e}$$

Where:

A_e= charge for house by each company, e.

For urban calls to fixed phones, mobile phones, inter-urban and international calls, a minute-value was estimated, taking into account the different tariffs according to time band, distance, in the case of inter-urban, and destination, in the case of internationals. For urban calls to fixed phones, an average price per minute is estimated for each company, PUF_e, from a weighted average of that value for each time band.

For each enterprise, e:

$$PUF_e = \sum_{i=1}^{2} W_i \,.\, PUF_i$$

Where:

PUF_i = price of urban call by company and time band ($i=1$ during regular hours and $i=2$ during reduced hours),

W_i = weight by time band, estimated from participation in the expenditure of companies in each time band.-

Then, the average price of urban calls to fixed phones, C_2, is calculated as the unweighted geometric mean of prices of urban calls to fixed phones of the n companies.

$$C_2 = \sqrt[n]{\prod_{e=1}^{n} PUF_e}$$

Where:

PUF_e = price of urban call by company, *e*.

For urban calls to mobile phones, an average price per minute is estimated for each enterprise, PUC_e, from a weighted average of that value for each time band. This case considers calls to phones of the same company and other companies.

For each company, *e*:

$$PUC_e = \sum_{b=1}^{n} z_b \sum_{i=1}^{2} x_i \,.\, PUC_{i,b}$$

Donde:

$PUC_{i,b}$ = price of urban calls to mobile phones by company, time band and destination (same company or other).

x_i = weight by time band, estimated from participation in the expenditure of companies in each time band (*i=1* during regular hours *i=2* reduced hours),

z_b = weight by expenditure for calls to mobile phones by destination (if same company (*b=1*) and other (*b=2, …, n)).*

Then, the average price of urban calls to mobile phones is calculated, C_3, as the unweighted geometric mean of those values, which in December 2015 is equal to 100.

$$C_3 = \sqrt[n]{\prod_{e=1}^{n} PUC_e}$$

Where:

PUC_e = price of urban calls to mobile phones by company.
For inter-urban calls, an average minute price is estimated for each company, PI_e, from a weighted average of the minute-value estimated for each distance code, taking into account for each code the minute-value in each time band.

For each company, *e*:

$$PI_e = \sum_{c=1}^{n} z_c \sum_{i=1}^{2} x_i \,.\, PI_{i,c}$$

$PI_{i,c}$ = price of inter-urban minute per code, c, and time band ($i=1$ during regular hours and $i=2$ reduced hours),

x_i = weight by time band, estimated from participation in the expenditure of companies in each time band,

z_c = weight of each code calculated on the basis of participation of company, e, in each code (c=1 to 12) over the total of inter-urban calls. This weight was estimated on the basis of data from ENACOM, Resolution No 2020/2015, for each company (Telecom and Telefónica) and data supplied in 1999 by companies.

Then, the average price of inter-urban calls to mobile phones is calculated, C_4, as the unweighted geometric mean of those values.

$$C_4 = \sqrt[n]{\prod_{e=1}^{n} PI_e}$$

Where:

PI_e = price of inter-urban calls of each company, e.

For international calls, a mean price per minute is estimated for each company, from a weighted average of the minute-value estimated for each selected destination, taking into account for each destination the minute-value in each time band.

For each company, e:

$$PX_e = \sum_{d=1}^{n} z_d \sum_{i=1}^{2} x_i \, . PX_{i,d}$$

Where:

$PX_{i,d}$ = price per minute of international calls by destination and time band,

x_i = weight by time band, estimated from participation in the expenditure of companies in each time band ($i=1$ during regular hours and $i=2$ reduced hours),

z_d = weight of each destination calculated on the basis of participation of the enterprise in destination d in the total expenditure in international calls to the five selected destinations.

Then, the average price of international calls is calculated, as the unweighted geometric mean of those values:

$$C_5 = \sqrt[n]{\prod_{e=1}^{n} PX_e}$$

Where:

PX_e = price of international calls of each company, e.

Finally, to estimate the fixed phone service index, TF, a weighted arithmetic mean of the estimated indices is calculated for each concept.

$$TF = \sum_{j=1}^{5} W_i \, . \, I_{C_i}$$

Where:

W_i = weight of each component,

I_{C_i} = index of each component,

Concept i = 1: charge, 2: urban calls to fixed phones, 3: urban calls to mobile phones, 4: inter-urban calls, and 5: international calls.

8.4 Mobile phone service

Technological changes during the last few years have impacted in the sector, which has made defining the service and monitoring its prices more complex. The choice made was to follow the price developments of this service from estimates of consumption profiles and assigning values to the different plans offered by companies, taking into account the different plans and services acquired (calls, text and data).

There are three types of plans: post-payment, prepaid and combined.

- Post-payment plans are those which are traded through a fixed-term contract between the operator and the consumer. If consumption exceeds the amount stipulated in the plan, the company bills for the total and charges it to date of closure (plan and surplus); the outgoing service is not suspended, and the total amount consumed is billed to date of closure.

- Prepaid plans entail prepayment by the consumer to acquire the service. With this modality, once the prepaid consumption is reached, the outgoing service is suspended, and a recharge purchase must be made to re-establish the service.

- Mixed plans, like post-payment services, entail a fixed-term contract, but, when the services included in the plan are consumed, the outgoing service is suspended and can be re-established with recharge or automatically in the following period.

The National Communications Entity provided information on monthly traffic by service and user, which was used to build an average profile. From the data on monthly traffic of outgoing calls for 2015 and the number of users by modality (post-paid and prepaid), the number of minutes for each type of plan (post-payment, prepaid and combined) was estimated. Then, with information on monthly traffic by service and user, the minutes were distributed in ON Net (to the same company) and OFF Net (to a different company) calls, and to fixed phones, and the number of texts was estimated. Additionally, the average data consumption was established. From the databases of mass consumer plans provided by ENACOM, the plans with the highest number of users from each company were selected for each type of plan. For each selected plan, the final value is calculated for consumption.

For each company, the average price of the type of plan is calculated from the geometric mean of the selected plans by type of consumption.

$$PC_{e,i} = \sqrt[3]{\prod_{j=1}^{3} PC_{e,i,j}}$$

Where:

$PC_{e,i,j}$ = value of selected plan by type of consumption j (j= 1: high, 2: medium, 3: low), of company e and type of plan i.

Then, the average price of the mobile phone service is calculated as the weighted arithmetic mean by number of clients in each company for each type of plan of *n* companies as follows:

$$PC = \sum_{\substack{e:1,\dots,n \\ i:1,..,3}} W_{e,i}\, PC_{e,i}$$

Where:

$PC_{e,i}$ = average price of type of plan i, of company e,

$W_{e,i}$ = weight of type of plan i (1: pre-payment, 2: postpaid, 3: mixed) for company e. Being $\sum_{\substack{e:1,\dots,n \\ i:1,..,3}} W_{e,i} = 1$.

8.5 Trains, urban, suburban and inter-urban buses and undergrounds in GBA region

For the public transport service in the total country, information is obtained on bus ticket values posted on official sites. In the particular case of the GBA region, there is disaggregated data for calculating the fee structure, which considers a multimode fare since February 2018.

In February 2018, the Ministry of Transport launched a new fee system, the multimode fare (or integrated fare) for public passenger transport services in the GBA region. These services are part of the CPI basket and are grouped in the Transport division. With this new system, changes in type of transport or transfers are considered during two-hour journeys. These transfers are called stages, and different discounts apply for the different stages of a journey. The inclusion of the integrated fee system in CPI calculations follow the guidelines of CPI-GBA Methodology 19, which established criteria for inclusion of discounts in different population groups. For this reason, the Ministry of Transport was asked to provide access to data on total train, bus and underground journeys during a normal operation working day (around 13 million records). This record allowed the identification of the integration stages of each journey and means of transport used by each user in each section of the journey. The data were analysed and processed to determine percentage share of the different journey stages, the corresponding fees for each stage, and the social attribute (full and concessionary rate) under the new integrated ticket system. These shares were determined for each means of transport, which allowed the estimation of the average price of train, bus and underground journeys required for a continuous calculation of the elementary indices of each public transport variety in the current CPI basket. Thus, the mean price of each means of transport, j, in month t, is given by:

$$T_j^t = \sum_a^2 W_a \sum_e^5 W_{ea} \prod_{d=1}^{n} P_{d,e,a}{}^{W_{dea}}$$

Where

$P_{d,e,a}$ = ticket price for a determined distance d, in an integration stage e and a social attribute that can be concessionary or regular rate,

W_{dea} = share of journeys in transport T for a certain distance d, in an integration stage e and a social attribute that can be concessionary or regular rate,

W_{ea} = share of transport journey T, in an integration stage e and a social attribute that can be concessionary or regular rate,

W_a = share of journeys in transport T with social attribute e, concessionary or regular rate.

Being $\sum_a \sum_e \sum_d W_{dea}=1$.

8.6 Tolls and national roads

For the estimation of tolls, category 2 personal vehicles are considered (2 axes, up to 2.10 m high and no double wheel). Each motorway or national road branch is considered as a separate informant and, if more than one toll is necessary to complete a route, the sum of tolls is considered (for example, the La Plata-Buenos Aires motorway).

$$\sum_{i}^{n} a_i \sum_{th=1}^{2} \beta_{\mathrm{th,i}} . \mathrm{P}_{\mathrm{th,i}}$$

Where:

$\mathrm{P}_{\mathrm{th,i}}$ is the price by branch, peak and off-peak,
a_i hours, is the weight by branch,
$\beta_{\mathrm{th,i}}$ is the weight by peak and off-peak hours and branch.

8.7 Procedures for the reimbursement of public tariffs

In some cases, public service companies, such as water and sewage, phone, natural gas and electricity, grant discounts to their clients. These discounts can be applied for several reasons, for example, if the government allows a company to use a new temporary fee schedule until a definitive schedule is selected. If the final tariff is lower than the temporal tariff, then the company must reimburse the difference to its clients for consumption in the current or future period. If the CPI considered these reimbursements for the calculation of service price indices (produced as credit in clients' bills) in the month in which they are produced, the price used could be as low as zero until the client is fully reimbursed. This causes public service price indices to be volatile. Additionally, this treatment of reimbursements means that indices do not correctly reflect the price of the service for the current period (paid by all clients that are not eligible for reimbursement and new clients). This treatment of reimbursements means that there could be a significant effect on the exchange rate of the CPI, since public service price indices are particularly volatile.

To reduce volatility in public service price indices and ensure that they adequately reflect the current price, INDEC's Directorate of Consumer Price Indices has decided that the CPI should not take into account any type of reimbursement for past payments when they appear in residential clients' bills as specific refund credit discounted from payments for current use. This means that the CPI does not consider reimbursements for past payments of which the consumers are not aware at the time of consumption. Namely, as in the rest of the goods and services, the CPI only reflects changes in prices faced by households at the time of the acquisition.

This treatment of public service reimbursements to clients for past consumption is recommended in the price index manual of the United States Bureau of Labor Statistics,[14] Statistics Canada[15] and the Australian Bureau of Statistics,[16] among others, use the same treatment.

[14] Bureau of Labor Statistics (2001).
[15] Statistics Canada (2008).
[16] Australian Bureau of Statistics (2005).

9. Dissemination

CPI results are released monthly, no more than 10 working days after the end of the reference month, in accordance with the periodicity and punctuality table of the International Monetary Fund's Special Data Dissemination Standard, to which INDEC adheres since 1996.

In compliance with international good practice, the dissemination of the CPI meets the timeliness and punctuality principles. Timeliness involves finding a balance between meeting the technical criteria to guarantee quality standards, which requires analysis, control, revision, editing and preparing contents in various formats and presenting results with the shortest delay possible for all users and with equal access possibilities.

The punctuality criterion is met by means of the advance release calendar which INDEC makes available on its website (www.indec.gob.ar). This helps ensure predictability and guarantee that release dates are not determined by the content of the publication nor any other external factor.

Additionally, INDEC releases CPI results in different formats with the highest possible level of disaggregation, observing the statistical confidentiality mandate set forth in Law No 17622.

Lastly, in accordance with INDEC Provision 176/99, Article 8, to safeguard the integrity of price collection samples and respondents, lists of households, natural or legal persons, or outlets are not provided.

10. Glossary

Aggregation: The process of adding values or lower levels of price indices to obtain higher levels. From highest to lowest level, the aggregations are general level, division, group, class, subclass, product and variety.

Arithmetic mean: Ratio of the sum of prices and the quantity of prices. It is used for price averages of different visits to the same business during a month.

Attribute: Characteristics of an item that complement its specification, thus allowing its precise identification, and which help standardise its price. For example, weight, size, model, brand.

Bandwagon effect: Variation of the index caused by differences in the days in which prices are effective, when comparing two consecutive months.

Base year of the CPI: Months or years used as base for the calculation of indices by the arithmetic mean of monthly mean prices. The CPI presented in this document uses December 2016 as base.

Basket: Set of varieties that undergo price collection for CPI purposes.

Business: For the CPI, it is the outlet, which is used widely to mean any store, marketplace, service outlet, or place where prices can be observed or obtained for CPI calculations.

Centrally collected prices: Prices collected directly by the CPI central office by phone, email, or websites.

Class: Each component in a group. Classes are divided into subclasses.

Classification of Individual Consumption According to Purpose (COICOP): United Nations classification, 1999. A classification of household consumption into divisions, groups and classes, according to households' purposes for expenditures, such as food, clothing, recreation, etc.

Consumers' purchasing power: Quantity of goods and services that an individual can acquire with a certain amount of money.

Consumption expenditure of households: Value of goods and services acquired by a household during a certain period for the satisfaction of its needs according to socially prevailing patterns or standards, excluding those destined to increasing the household's net worth.

Cost of living index (COLI): In theory, an index that measures the change in minimum expenditures (expressed in current prices) that would be incurred by a consumer to maintain a given standard of living. It has been proven that, under certain conditions, a Laspeyres-type index is above, and a Paasche-type is below the theoretical cost of living index.

CPI variation: percentage change of the current CPI value compared with a previous value.

Current prices: Prices of the same period during which the quantities produced, sold or consumed are measured.

Division: Each of the 12 main groupings of the CPI. It is divided into groups.

Elementary index: A price index of a variety, which is calculated as a mean price relative.

Estimated or imputed price: Price replacing an unavailable price, obtained by an appropriate estimation procedure. See Imputation method.

Fixed basket index: An index in which the goods and services quantities are not modified during a certain period.

Geometric mean: Root n of the product of n prices.

Group: Each component in a division. Each group is divided into classes.

Grouping (of elementary indices): set of elementary indices whose price development is generally similar for the purposes of the CPI. Some examples of groupings are the core, seasonal, regulated, goods and services categories.

Imputation: The process of assigning a price to a product-business for which the price has been reported unavailable in a particular month.

Incidence: The percentage by which the general level of the index would have varied, by effect of price variation in a certain grouping, if the prices in the remaining groupings had remained constant.

Index: An indicator that measures percentage change with regard to a base value.

Inflation: General and continued price increase in a given economy.

Item: A good or service with a particular specification and attributes.

Laspeyres formula: Ratio of a value of quantities consumed in the base year during the current period and the value consumed in the base year.

Laspeyres index: See **Laspeyres formula**.

Matched Laspeyres formula: Matched expression of the Laspeyres formula, separating the relative price component from the weight.

Monthly price relative of a variety: Ratio of the mean price of a variety in a certain month and its mean price in the previous month. The CPI can be calculated as the weighted arithmetic mean of these relatives (See **Matched Laspeyres formula**).

Observed price: A price collected in the reference month.

Paasche formula: Ratio between the consumption value in the current period and the value that the consumption would have at base year prices.

Panel: Each working day of the month, so that every month has exactly the same number of days. For the CPI base 2016=100, there are 20 panels.

Price collector: Person who visits businesses (or surveys them by phone or other channel) to obtain data on prices.

Price observation: Each collected price of a specific item during a visit to a certain business. For the CPI base 2016=100, approximately 320,000 prices are collected monthly.

Price relative: Ratio of prices from different periods.

Price validation: Comparative statistical analysis process to remove price collection or entry errors.

Price: Exchange of a good or service unit available for delivery when paid outright.

Product: Each grouping in a subclass. Each product is divided into varieties. They correspond to the national adaptation of the COICOP and are used for operational analysis.

Quality adjustment: An adjustment to the price of an item that is needed when the quality of the item has changed it has to be compared with the item it replaces. Current prices are corrected upward or downward by means of an equivalent factor of the change in quality.

Quality changes: Changes in the goods and services or form of marketing that cause a significant difference in utility for the consumer of a new good or service that replaces the previous item selected for the CPI.

Reference population: The set of households whose consumption expenditure is taken into account to calculate CPI weights.

Respondent: See **Business**.

Scope of the CPI: Reference population, domain of goods and services whose price movements is represented by the index, and geographic area represented in the price collection.

Seasonal variety: A good or service which is only available during certain periods of the year.

Specification: Characteristics that an item must present to belong to a certain variety.

Standardisation: A transformation process applied to a price to standardise its unit of measure with the unit of measure conventionally applied to all items-businesses of its variety.

Subclass: Each grouping in a class. Subclasses are divided into products. They correspond to the national adaptation of the COICOP and are used for operational analysis.

Substitution effect: Behaviour of consumers in which they modify the composition of their consumption basket, reacting to changes in relative prices.

Unavailable price: Prices are considered unavailable in a product-business of the panel when they do not exist, are out of season or are no longer sold in the store, and when prices could not be collected due to the store being closed.

Variety: Each grouping in a product. For the CPI base 2016=100, there are 609 varieties (607 maximum), each having its own weight. For every month, the price of a variety is the geometric mean of the prices of its items-businesses, observed on different dates of the same month, according to the collection schedule.

Weight reference year: For the CPI base December 2016, the data source for calculating weights was the Household Expenditure Survey 2004/05.

Weight: Ratio that indicates the relative importance of a component in an aggregate. For the CPI, the weights of products and higher levels are only updated when the originating expenditure survey is changed.

Weighted arithmetic mean: Ratio of the sum of n components by their respective weights and the sum of weights.

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12. Annex I. Divisions of the COICOP 1999

As of the release of the CPI with national coverage in June 2017, INDEC adopted the United Nations 1999 Classification of Individual Consumption According to Purpose (COICOP).

This classification has a first disaggregation level comprised by 12 divisions: Food and non-alcoholic beverages; Alcoholic beverages and tobacco; Clothing and footwear; Housing, water, electricity, gas and other fuels; Household equipment and maintenance; Health; Transport; Communication; Recreation and culture; Education; Restaurants and hotels; Miscellaneous goods and services.

Food and non-alcoholic beverages: all food and non-alcoholic beverages acquired to be consumed within the home.

Alcoholic beverages and tobacco: alcoholic beverages, cigarettes and lighters.

Clothing and footwear: clothing (winter clothing, inner and outer wear for women, men and children), footwear (for women, men and children), accessories and services (materials, fibres, accessories for making clothing, repair of clothing and footwear).

Housing, water, electricity, gas and other fuels: rentals, usual expenditure and repairs, household fuels (bottled gas, gas through networks, firewood, among others), water and electricity.

Household equipment and maintenance: goods for household equipment (furnishings, appliances, tableware and linen); articles for household maintenance (articles for cleaning and tools) and services for household maintenance (repair of furniture, repair of appliances, dry-cleaning, laundering and domestic services).

Health: medical products and therapeutic appliances (medicaments, first-aid kits, appliances and accessories) and health services (prepaid medical assistance system, medical and dental consultation, medical analysis and x-rays).

Transport: purchase and sale of personal vehicles, maintenance (fuel, insurance, parking, etc.), public transport.

Communication: residential and mobile phone services, internet services, postal services, fixed and mobile phone equipment, among others.

Recreation and culture: tourism services, audio, television, video and computer equipment, recreational services (sports events, cinema, theatre, concerts, sports club subscriptions, cable television, etc.), books, newspapers and non-professional magazines; and other goods (cinematographic and photographic equipment and their accessories, films; toys and games, pets and sports articles). Also includes educational texts and materials.

Education: educational services for formal education (tuition and fees for pre-primary, primary, secondary and tertiary education) and non-formal education (languages, among others).

Restaurants and hotels: food outside the house and hotels.

Miscellaneous goods and services: personal care articles, personal care services and other diverse goods and services.

13. Annex II. Regional weight structure

Table 7. Regional CPI structure of weights. December 2016. Percentage

Code	Main breakdown	Geographic region					
		GBA	Pampas	North-East	North-West	Cuyo	Patagonia
		%					
0	**General level**	100.00	100.00	100.00	100.00	100.00	100.00
01	**Food and non-alcoholic beverages**	23.44	28.65	35.30	34.67	28.42	27.43
01.1	Food	20.33	25.73	31.66	30.31	25.47	24.77
01.1.1	Bread and cereals	4.05	5.02	6.59	6.49	5.21	4.61
01.1.2	Meat and meat products	6.98	9.81	13.27	12.50	10.32	9.92
01.1.3	Fish and seafood	0.51	0.47	0.29	0.34	0.45	0.48
01.1.4	Milk, dairy produce and eggs	3.45	3.73	4.10	3.69	3.55	3.68
01.1.5	Oils, fats and butter	0.55	0.76	0.90	0.64	0.66	0.63
01.1.6	Fruit	1.27	1.46	1.46	1.45	1.10	1.28
01.1.7	Vegetables and roots	2.23	2.90	3.59	3.58	2.79	2.68
01.1.8	Sugar, confectionery, chocolate, etc.	1.01	1.21	1.12	1.24	1.03	1.02
01.1.9	Other food	0.29	0.37	0.36	0.36	0.36	0.48
01.2	Non-alcoholic beverages	3.11	2.92	3.64	4.36	2.95	2.66
01.2.1	Coffee, tea, mate and cocoa	0.68	0.82	0.93	0.64	0.66	0.69
01.2.2	Mineral water, soft drinks and juices	2.43	2.10	2.71	3.72	2.29	1.97
02	**Alcoholic beverages and tobacco**	3.27	3.80	3.64	3.13	3.57	3.50
02.1	Alcoholic beverages	1.42	1.79	2.04	1.37	1.42	1.40
02.1.1	Spirituous and distilled beverages and liqueurs	0.06	0.06	0.03	0.07	0.05	0.09
02.1.2	Wines	1.07	1.39	1.45	1.02	1.11	1.00
02.1.3	Beer	0.29	0.34	0.56	0.29	0.26	0.31
02.2	Tobacco	1.85	2.01	1.60	1.76	2.15	2.10
03	**Clothing and footwear**	8.49	10.43	11.60	12.37	11.38	12.82
03.1	Clothing and materials	6.33	7.68	7.97	8.38	8.26	8.96
03.1.1	Textiles, fabric and yarn	0.09	0.09	0.06	0.09	0.10	0.11
03.1.2	Clothing	5.76	7.26	7.62	7.95	7.82	8.50
03.1.3	Other articles of clothing and clothing accessories	0.25	0.22	0.23	0.25	0.23	0.25
03.1.4	Cleaning, repair and hire of clothing	0.25	0.11	0.06	0.08	0.11	0.09
03.2	Footwear	2.15	2.75	3.63	4.00	3.12	3.86
03.2.1	Shoes and other footwear	2.09	2.71	3.55	3.92	3.02	3.81
03.2.2	Cleaning, repair and hire of footwear	0.06	0.04	0.08	0.08	0.10	0.05
04	**Housing, water, electricity and other fuels**	10.46	8.67	8.11	7.00	8.88	10.06
04.1	Rentals for housing and related expenses	5.80	3.91	2.36	1.98	3.80	5.11
04.1.1	Rentals for housing	3.48	3.59	2.22	1.87	3.67	4.99
04.1.3	Normal expenditures of the dwelling and/or garage and other expenses	2.32	0.32	0.14	0.12	0.14	0.13
04.3	Maintenance and repair of the dwelling	1.23	1.16	1.12	0.71	1.17	1.03
04.3.1	Materials for the repair of the dwelling	0.52	0.50	0.57	0.38	0.74	0.69
04.3.2	Services for the repair of the dwelling	0.70	0.67	0.55	0.33	0.43	0.34
04.4	Water supply	0.89	0.62	0.89	0.67	0.60	0.98
04.5	Electricity, gas and other fuels	2.54	2.98	3.74	3.64	3.32	2.94
04.5.1	Electricity	1.03	1.08	2.76	1.78	1.28	1.81
04.5.2	Gas	1.51	1.90	0.98	1.86	2.03	1.13

(continued)

Cuadro 7. **(continuation)**

Code	Main breakdown	Geographic region					
		GBA	Pampas	North-East	North-West	Cuyo	Patagonia
				%			
05	**Household equipment and maintenance**	6.27	6.34	7.78	6.12	6.28	6.55
05.1	Furniture, furnishings, carpets and other floor coverings	0.60	0.53	0.75	0.57	0.62	0.90
05.2	Household textiles	0.26	0.25	0.28	0.28	0.32	0.35
05.3	Household appliances	1.14	1.22	2.53	1.02	1.04	1.59
05.4	Tableware, utensils, ceramic tableware and glassware	0.27	0.26	0.35	0.29	0.28	0.39
05.5	Tools and equipment for house and garden	0.33	0.27	0.31	0.26	0.34	0.30
05.6	Goods and services for household maintenance	3.66	3.81	3.55	3.69	3.68	3.03
05.6.1	Non-durable household goods	1.67	2.12	2.09	2.04	2.05	1.79
05.6.2	Domestic services and household services	1.99	1.69	1.47	1.66	1.64	1.23
06	**Health**	8.80	8.16	5.26	6.33	7.40	4.95
06.1	Medical products, appliances and equipment	3.95	4.76	3.38	4.01	4.98	2.63
06.1.1	Pharmaceutical products	3.53	4.26	2.93	3.60	4.55	2.16
06.1.2	Other medical products	0.16	0.18	0.21	0.18	0.18	0.11
06.1.3	Therapeutic appliances and equipment and their repairs	0.25	0.31	0.24	0.23	0.24	0.36
06.2	Outpatient services	1.68	1.61	1.19	1.57	1.42	1.49
06.2.1	Outpatient medical services	1.08	0.85	0.49	0.79	0.91	0.78
06.2.2	Dental services and treatments	0.46	0.48	0.50	0.57	0.24	0.49
06.2.3	Outpatient ancillary services	0.14	0.28	0.19	0.21	0.27	0.23
06.4	Healthcare and health insurance expenses	3.18	1.79	0.70	0.75	1.00	0.82
07	**Transport**	11.59	10.41	9.63	8.41	12.10	13.42
07.1	Purchase of vehicles	2.48	2.89	2.76	1.58	2.95	4.92
07.1.1	Motor cars	2.45	2.71	2.35	1.35	2.84	4.77
07.1.2	Motor cycles	0.02	0.15	0.33	0.18	0.09	0.08
07.1.3	Bicycles	0.01	0.03	0.08	0.05	0.03	0.07
07.2	Operation of personal transport equipment	5.08	5.54	4.91	4.48	6.90	6.07
07.2.1	Operation of household transport equipment	0.56	0.52	0.41	0.41	0.87	0.66
07.2.2	Fuel and lubricants for household vehicles	3.78	4.59	4.26	3.80	5.63	5.12
07.2.3	Maintenance and repair of household vehicles	0.15	0.14	0.10	0.07	0.22	0.16
07.2.4	Other services related to household vehicles equipment	0.59	0.29	0.15	0.20	0.18	0.13
07.3	Public transport	4.02	1.98	1.96	2.35	2.25	2.44
07.3.1	Land transport services	3.32	1.93	1.91	2.33	2.10	2.17
07.3.2	Transport services by railway	0.40					
07.3.3	Transport services by air	0.26	0.03	0.02	0.01	0.11	0.21
07.3.6	Other transport services	0.04	0.02	0.02	0.01	0.05	0.06
08	**Communication**	2.81	2.86	2.82	2.59	2.53	3.19
08.1.1	Postal services	0.02	0.02	0.03	0.03	0.02	0.03
08.2	Telephone equipment	0.08	0.05	0.05	0.08	0.07	0.03
08.2.1	Fixed telephone equipment	0.02	0.00	0.00	0.00	0.00	0.00
08.2.2	Mobile telephone equipment	0.06	0.05	0.05	0.08	0.06	0.02
08.3	Telephone and internet services	2.72	2.79	2.74	2.48	2.45	3.13
08.3.1	Fixed telephone service	0.58	0.61	0.60	0.53	0.54	0.67
08.3.2	Mobile phone service	1.39	1.47	1.43	1.28	1.31	1.61
08.3.3	Internet services	0.76	0.71	0.71	0.67	0.60	0.85

(continúa)

Cuadro 7. **(continuation)**

Code	Main breakdown	Geographic region					
		GBA	Pampas	North-East	North-West	Cuyo	Patagonia
		%					
09	**Recreation and culture**	7.46	7.39	6.23	5.95	6.72	7.77
09.1	Audiovisual. photographic. video and information processing equipment	1.34	1.19	1.34	1.06	1.08	1.72
09.1.1	Equipment for the reception, recording and reproduction of sound and pictures	0.42	0.46	0.83	0.52	0.47	0.73
09.1.2	Photographic and cinematographic equipment and optical instruments	0.19	0.13	0.03	0.05	0.05	0.19
09.1.3	Information processing equipment	0.44	0.39	0.33	0.31	0.30	0.51
09.1.4	Recording media	0.29	0.21	0.16	0.18	0.27	0.30
09.3	Other recreational items and equipment, gardens and pets	1.07	0.97	0.59	0.83	1.14	1.04
09.3.1	Games, toys and hobbies	0.36	0.40	0.27	0.44	0.44	0.41
09.3.2	Equipment for sport, camping and open-air recreation	0.07	0.09	0.03	0.04	0.04	0.10
09.3.4	Pets and related products	0.65	0.48	0.30	0.36	0.66	0.53
09.4	Recreation and culture services	3.05	2.88	2.28	2.27	2.68	3.02
09.4.1	Recreation and sporting services	0.86	0.47	0.37	0.40	0.52	0.42
09.4.2	Cultural services	2.19	2.41	1.90	1.88	2.16	2.61
09.5	Newspapers, journals, magazines, books and stationery	1.49	1.62	1.84	1.58	1.52	1.83
09.5.1	Books	0.69	0.60	0.86	0.64	0.80	0.91
09.5.2	Newspapers and periodicals	0.51	0.58	0.50	0.48	0.41	0.41
09.5.4	Stationery and drawing materials	0.30	0.44	0.48	0.45	0.31	0.51
09.6	Package holidays	0.50	0.74	0.18	0.21	0.30	0.16
10	**Education**	3.02	1.61	1.36	2.04	2.24	2.09
10.1	Pre-primary and primary education	1.30	0.66	0.34	0.89	0.70	0.76
10.2	Secondary education	0.48	0.15	0.14	0.30	0.20	0.29
10.3	Post-secondary, non-tertiary education	0.63	0.38	0.52	0.47	0.92	0.39
10.5	Education not definable by level	0.61	0.42	0.36	0.39	0.41	0.65
11	**Restaurants and hotels**	10.84	8.10	4.96	7.99	6.85	5.08
11.1	Restaurants and food outside the home	10.31	7.84	4.84	7.82	6.52	4.91
11.2	Hotels	0.53	0.26	0.11	0.16	0.32	0.16
12	**Miscellaneous goods and services**	3.55	3.58	3.30	3.40	3.63	3.14
12.1	Personal care	2.82	3.07	3.07	3.18	3.11	2.66
12.1.1	Hairdressing salons and personal grooming outlets	0.85	0.67	0.55	0.55	0.70	0.53
12.1.3	Other appliances, articles and products for personal care	1.97	2.40	2.52	2.63	2.40	2.13
12.5	Insurance	0.47	0.32	0.10	0.08	0.33	0.35
12.7	Other services	0.26	0.19	0.13	0.14	0.19	0.13

Source: INDEC, Directorate of Consumer Price Indices.

Table 8. **Weights of CPI categories. December 2016. Percentage**

	GBA	Pampas	North-East	North-West	Cuyo	Patagonia
			%			
Seasonal	10.3	12.0	12.5	12.8	11.7	12.4
Core	67.0	68.7	69.9	69.3	67.5	67.6
Regulated	22.8	19.3	17.7	17.9	20.8	20.0

Source: INDEC. Directorate of Consumer Price Indices.

Table 9. **Weights of CPI goods and services. December 2016. Percentage**

	GBA	Pampas	North-East	North-West	Cuyo	Patagonia
			%			
Goods	59.3	70.1	77.4	75.2	71.2	71.3
Services	40.7	29.9	22.6	24.8	28.8	28.7

Source: INDEC. Directorate of Consumer Price Indices.