

## Consumer Price Indices

### Methodological note

The **Consumer Price Index for the whole nation (NIC)** is based on the consumption of the entire population present.

The **Harmonised index of Consumer Prices (HICP)**, calculated according to the EU regulations in force, is used for the comparison of inflation between Member States and as a key indicator for the monetary policy of the European Central Bank.

Consumer price indices are calculated using a chained Laspeyres formula, in which the basket of products and the weighting system are updated annually. Monthly indices for the current year are calculated with reference to December of the previous year (calculation base) and subsequently chained over the period chosen as a reference base in order to be able to measure price trends over a period of time longer than a year<sup>1</sup>.

#### Reference base year for NIC and HICP

The NIC indices are expressed with 2010=100 as a reference base year<sup>2</sup>.

The HICP, on the other hand, are calculated and published with 2005=100 as a reference base, as established by the Regulation (EC) no 1708/2005 of the 20<sup>th</sup> October 2005.

#### Classification for consumer expenditure, basket of goods

The classification of consumer spending adopted for the consumer price indices is the international COICOP (*Classification of Individual Consumption by Purpose*) whose hierarchical structure makes provision for three levels of disaggregation: *Divisions, Groups and Classes*.

Starting from data referred to January 2011, the indices are calculated according to a more detailed classification scheme which takes into account, with some adjustments, the proposed revision of the COICOP classification currently being discussed in Europe for disaggregation levels lower than *Classes*. The classification scheme, which is adopted for the three consumer price indices published by ISTAT, is distinguished by two additional lower levels of disaggregation, *Product Sub-Classes* and *Consumption segments*. Consumption segments are represented by a sample of products or groups of products items, called *Representative items*. In 2015, there are 618 representative items (1,441 products) for NIC and 623 representative items (1,457 products) for the HICP.

As regards NIC, the indices are released with a level of detail that reaches 326 consumption segments; NIC indices by type of products (a classification of goods and services different from the COICOP), by regulated and non-regulated products and by purchase frequency are also calculated and released.

As regards HICP, the indices are published with a level of detail of the COICOP-HICP product classes, in accordance with the publication carried out by Eurostat for the HICP of single EU countries and for the HICPs calculated for the EU and the EMU; furthermore, HICP indices by special aggregates (**HICP-SA**) are released. HICP-SA indices are calculated using the same classification scheme and the same method adopted by Eurostat (therefore different from the method used for the calculation of NIC indices by type of products), in order to guarantee comparability among the Italian HICPs and the HICP of the other EU countries and the HICPs for the EU and the euro area produced by Eurostat<sup>3</sup>.

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<sup>1</sup> ISTAT calculates another index named Consumer Price Index for blue- and white-collar worker households (FOI) based on consumption of households whose reference person is an employee.

<sup>2</sup> The FOI indices are expressed with 2010=100 as a reference base year, too.

<sup>3</sup> HICP-SA indices have been released starting from data referred to February 2013.

The description of product classes which are included in the special aggregates is available on Eurostat web site at the following link: [http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST\\_NOM\\_DTL&StrNom=HICP\\_2000&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=](http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=HICP_2000&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=).

All indices are published in I.Stat, the warehouse of statistics produced by ISTAT, inside the theme Prices, sub-theme Consumer prices (<http://dati.istat.it>). In I.Stat, in addition to indices at national level, NIC indices at provincial, regional and macro area level and FOI indices at provincial level are published.

### Price collection and calculation method for seasonal product price indices

The method for collecting and calculating prices of seasonal products is in accordance with Regulation (EC) no 330/2009 of 22<sup>nd</sup> April 2009, which sets out minimum standards for dealing with seasonal products in the HICP<sup>4</sup>. This method, also used for the NIC<sup>5</sup>, is applied to the product groups and classes *Fruit, Vegetables, Clothing and Footwear*.

The European Regulation defines as a *seasonal product* one which, during certain periods of the year (of at least one month), it may not be possible to purchase, or is purchased in modest or insignificant volumes by consumers. It also establishes that in a given month seasonal products are considered *in season* or *out of season*.

On the basis of this standard, ISTAT has defined a monthly calendar for the whole 2015, which establishes in a given month when each specific product belonging to the abovementioned product groups or classes must be considered *in season* or *out of season*. The adoption of a seasonality calendar entails that the local consumer price survey is carried out only in months in which the product in question is defined as *in season*, while prices of *out of season* products will be estimated on the basis of a method that is consistent with standards contained in the aforementioned European regulation.

### Survey geographical basis and rate of coverage, temporal coverage

In 2015 the geographical basis of the survey is made up of 80 municipalities (19 regional capitals and 61 provincial capitals) – which participate in the indices calculation for all the representative items of the basket – and of other 12 municipalities participating in the survey for a subset of products which includes local tariffs (water supply, solid waste, sewerage collection, gas for domestic use, urban transport, taxi, car transfer ownership, canteens in schools, public day nursery, etc.) and some local services (building worker, football matches, cinema, theatre shows, secondary school education, canteens in universities etc.).

Overall, the coverage of the index, measured in terms of resident population in the provinces with capitals participating in the survey for all items in the basket, is 83.5%.

Concerning the basket subset including local tariffs and some local services – whose weight on the NIC basket is equal to 6.8% – with the participation of the other 12 municipalities, the coverage of the survey, measured in terms of provincial resident population, rises to 91.9%.

In the consumer price survey, in 2015, there are more than 41,300 statistical units (including outlets, enterprises and institutions) where the price of at least one product is monitored, as well as around 8,000 dwellings for observing rents.

Monthly 597,500 prices are collected: 501,900 are collected locally by Municipal Offices of Statistics and around 95,600 are collected by Istat directly (of which about 13,000 are surveyed using web scraping techniques for data collection on Internet).

With regard to the local survey, price collection is carried out in the first fifteen working days:

- bi-monthly for products which show a strong temporal variability of their prices (fresh fruit and vegetables, fresh fish; transport fuels; gas in cylinder and heating oil);
- once a month, for the remaining products. For some goods or services, such as for example, water supply, town gas and natural gas, urban transport by bus and combined urban transport, taxi or tickets (contributions to NHS) for specialist practice, services of medical analysis laboratories and X-ray centres and other paramedical services, it is detected the price applied the 15<sup>th</sup> day of the month to which the index is referred.

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The HICP-SA calculation method is described in the HICP Compendium which is downloadable at the following link: <http://ec.europa.eu/eurostat/documents/3859598/5926625/KS-RA-13-017-EN.PDF/59eb2c1c-da1f-472c-b191-3d0c76521f9b?version=1.0>.

Back series starting from January 2001 are published on I.Stat, the warehouse of statistics produced by ISTAT, inside the theme Prices (<http://dati.istat.it>).

<sup>4</sup> It has been adopted starting from data referred to January 2011.

<sup>5</sup> It is used for FOI indices, too.

Concerning the centralized survey, price collection is widely carried out once a month in the first fifteen working days. Hereafter the exceptions to the general rule:

- for some goods and services such as for example tobacco, games of chance, medicines, telecommunications services, regional railway transport, wagon lits, out of town bus services, out of town combined passenger transport, postal services, highway tolls, car transfer ownership, car overhaul, it is detected the price applied the 15th day of the month to which the index is referred
- three times per month, according an annual calendar fixed at the beginning of the year, for national railway transport;
- bi-monthly for passenger transport by air, passenger transport by sea and inland waterway, local daily newspapers and magazines;
- on each day of the month for touristic, recreational and cultural services (Fun parks entrance ticket, Bathing establishment, Ski lifts, etc.).

## Weighting structure

In the table 1 the weighting structure for the year 2015 of NIC and HICP is reported.

TABLE 1. WEIGHTS USED FOR CALCULATING CONSUMER PRICE INDICES, BY EXPENDITURE DIVISION. YEAR 2015, percentage values

Expenditure divisions	Weights	
	NIC	HICP
Food and non-alcoholic beverages	16.5266	17.5648
Alcoholic beverages, tobacco	3.2606	3.4691
Clothing and footwear	7.0229	8.1002
Housing, water, electricity, gas and other fuels	11.5963	12.3585
Furnishings, household equipment and routine household maintenance	7.6036	8.1145
Health	8.4390	4.0036
Transport	13.8039	14.6884
Communication	2.5408	2.7079
Recreation and culture	7.8524	6.2208
Education	1.2085	1.2876
Restaurants and hotels	11.1555	11.8779
Miscellaneous goods and services	8.9899	9.6067
<b>All items</b>	<b>100.0000</b>	<b>100.0000</b>

## Harmonized index of consumer prices at constant tax rates

The Harmonized Index of Consumer Prices at constant tax rates (**HICP-CT**)<sup>6</sup> is calculated as established by the Regulation (EC) no 119/2013 of the 11<sup>th</sup> February 2013. It measures the change of prices at constant tax rates. It follows the same computation principles as the HICP, but is based on prices 'at constant tax rates'.

Prices at constant tax rates are estimated cancelling out the effects due to changes in taxes in the current month compared to the tax rates system in force in December of previous year (calculation period base).

The taxes considered in the HICP-CT are those directly linked to final consumption. They are mainly VAT, excise duties and other taxes on some specific items (such as cars and insurance). Subsidies and taxes paid on intermediate stages (e.g. production, transportation) are not taken into account. In principle, for the compilation of HICP-CT, all taxes should be included and kept constant; however, due to practical consideration, taxes which generate very small tax revenues may not be taken into account. In detail, according to recommendations reported in the Eurostat HICP-CT Manual, taxes which cover less than 2% of the total tax revenue can be excluded. On the whole, included taxes must cover a minimum of 90% total tax revenue. Therefore in the compilation of the Italian HICP-CT, taxes kept constant are the following: VAT, excise duties on tobacco and energy items (fuels, heating oil, gas, electricity, etc.), the main local surcharge on electricity and gas, tax for the public liability insurance and contribution to the National Health Service for

<sup>6</sup> The HICP-CT has been released starting from data referred to March 2012. Back series starting from January 2002 are published on I.Stat, inside the theme Prices (<http://dati.istat.it>).

transport means insurance. On the basis of National Accounts data taxes which cover less than 1% of the total tax revenue are excluded and, on the whole, taxes included cover almost 98% of total revenues carried out with taxes on final consumption.

The HICP-CT covers the same goods and services as those covered by the HICP. The same weight structure is applied as for the HICP (Table 1). As HICP, it has expressed 2005=100 as a reference base year.

The HICP-CT provides a measure of the **theoretical impact** of changes of indirect taxes on the overall HICP inflation. It has to be emphasised that it does not provide an exact measure of this impact, rather an indication for its upper limit. In effect, the difference between HICP and HICP-CT growth rates points to the theoretical impact of tax changes on overall HICP inflation, assuming an instantaneous and full pass-through of tax rate changes on the price paid by the consumer.

It has to be pointed out that, during the year, the Italian HICP-CT **may be revised** following introduction of methodological changes required by indirect taxation system changes. Data become final in the next year to the reference one.

### Indices rates of change calculation

Hereafter formulae for the calculation of monthly, annual and annual average rates of change for consumer price indices are described<sup>7</sup>. The HICP formulae apply also to HICP-CT. The first expression concerns calculation of rates of change between indices in the same reference base period:

#### ■ Monthly rate of change (NIC, HICP)

The monthly rate of change is the current month's index in respect to the previous month's index (with one decimal place), for example:

$$MOR(I_{Jan,2012}; I_{Feb,2012}) = Round\left(\frac{I_{Feb,2012}}{I_{Jan,2012}} \times 100 - 100; .1\right)$$

#### ■ Annual rate of change (NIC, HICP)

The annual rate of change is the current month's index in respect to the same month's index a year previously (with one decimal place), for example:

$$ANR(I_{Feb,2011}; I_{Feb,2012}) = Round\left(\frac{I_{Feb,2012}}{I_{Feb,2011}} \times 100 - 100; .1\right)$$

#### ■ Annual average rate of change (NIC)

The annual average rate of change is the current annual average index in respect to a previous annual average index (with one decimal place), for example:

$$AVR(I_{2011}; I_{2012}) = Round\left(\frac{I_{2012}}{I_{2011}} \times 100 - 100; .1\right)$$

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<sup>7</sup> The expressions and the rounding rules described for NIC are also carried out for FOI.

■ Annual average rate of change (**HICP**)

For the HICP, in a different way compared to NIC, the annual average rate of change is obtained directly from the monthly indices and therefore it is based on the unrounded annual average indices. This method, applied in compliance with Eurostat, guarantees international comparability of data. For example:

$$AVR(I_{2011}; I_{2012}) = Round \left( \frac{\sum (I_{Jan,2012} + I_{Feb,2012} + \dots + I_{Dec,2012})}{\sum (I_{Jan,2011} + I_{Feb,2011} + \dots + I_{Dec,2011})} \times 100 - 100; .1 \right)$$

The following expression describes the calculation of monthly rate of change between indices expressed in different reference base year; it can be also used for the calculation of the annual rate of change and the annual average rate of change:

■ Monthly rate of change - **Indices expressed in different reference base year**

$$MOR(I_{m,j}^{X_1}; I_{n,h}^{X_t}) =$$

$$= Round \left( \frac{I_{n,h}^{X_t}}{I_{m,j}^{X_1}} \times C(X_t; X_{t-1}) \times C(X_{t-1}; X_{t-2}) \times \dots \times C(X_2; X_1) \times 100 - 100; .1 \right)$$

where  $I_{m,j}^{X_1}$  is the index, with one decimal place, of the month  $m$  year  $j$ , expressed in the more remote reference base  $X_1$ ,  $I_{n,h}^{X_t}$  is the index, with one decimal place, of the month  $n$  year  $h$ , expressed in the more recent reference base  $X_t$ , and  $C(X_i; X_{i-1})$  with  $i=2, \dots, t$  are the splicing coefficients between contiguous reference bases. These coefficients are equal to the annual average index of the year corresponding to the new reference base expressed in the previous base, divided by 100. They are as many as base changes have been carried out during the considered period.