November 2022
CONSUMER PRICES
Provisional data

- According to preliminary estimates, in Novembre 2022 the rate of change of the Italian consumer price index for the whole nation (NIC) was +0.5% on monthly basis and +11.8% on annual basis (the same as in October).

- The stable growth on annual basis of All-item index was due to the offset of opposite dynamics: on the one hand, the prices of Non-regulated energy products (from +79.4% to +69.9%) slowed down, together with the prices of Unprocessed food (from +12.9% to +11.3%) and of Services related to transport (from +7,2% to +6.8%). On the other hand, the prices of Regulated energy products (from +51.6% to +56.1%), of Processed food including alcohol (from +13.3% to +14.4%), of Non-energy industrial goods (from +4.6% to +5.0%), of Services related to recreation, including repair and personal care (from +5.2% to +5.5%), sped-up.

- Therefore, core inflation (excluding energy and unprocessed food) was +5.7% (up from +5.3% in the previous month) and inflation excluding energy was +6.1% (up from +5.9% in October).

- The annual rate of change of prices of Goods was +17.5% (from +17.6% in the previous month) and that of prices of Services was +3.8% (the same as in October). As a consequence, the negative inflationary gap between Services and Goods slightly decreases (from -13.8 percentage points in October to -13.7).

- Prices of Grocery and unprocessed food increased by +1.0% on monthly basis and by +12.8% on annual basis (up from +12.6% in the previous month).

- The increase on monthly basis of NIC was mainly due to the prices of Regulated energy products (+3.0%) and Non-regulated energy products (+2.2%), of Processed food (+1.5%) and of Non-durable goods (+0.6%); the prices of Services related to recreation, including repair and personal care (-0.4%) and of Services related to transport (-0.2%), decreased mainly for seasonal factors.

- In November 2022, according to preliminary estimates, the Italian harmonised index of consumer prices (HICP) increased by 0.6% on monthly basis and by 12.5% on annual basis (from +12.6% in the previous month).

CHART 1. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC)
January 2017 – November 2022, month on previous month and month on same month a year ago percentage changes (index, 2015=100)
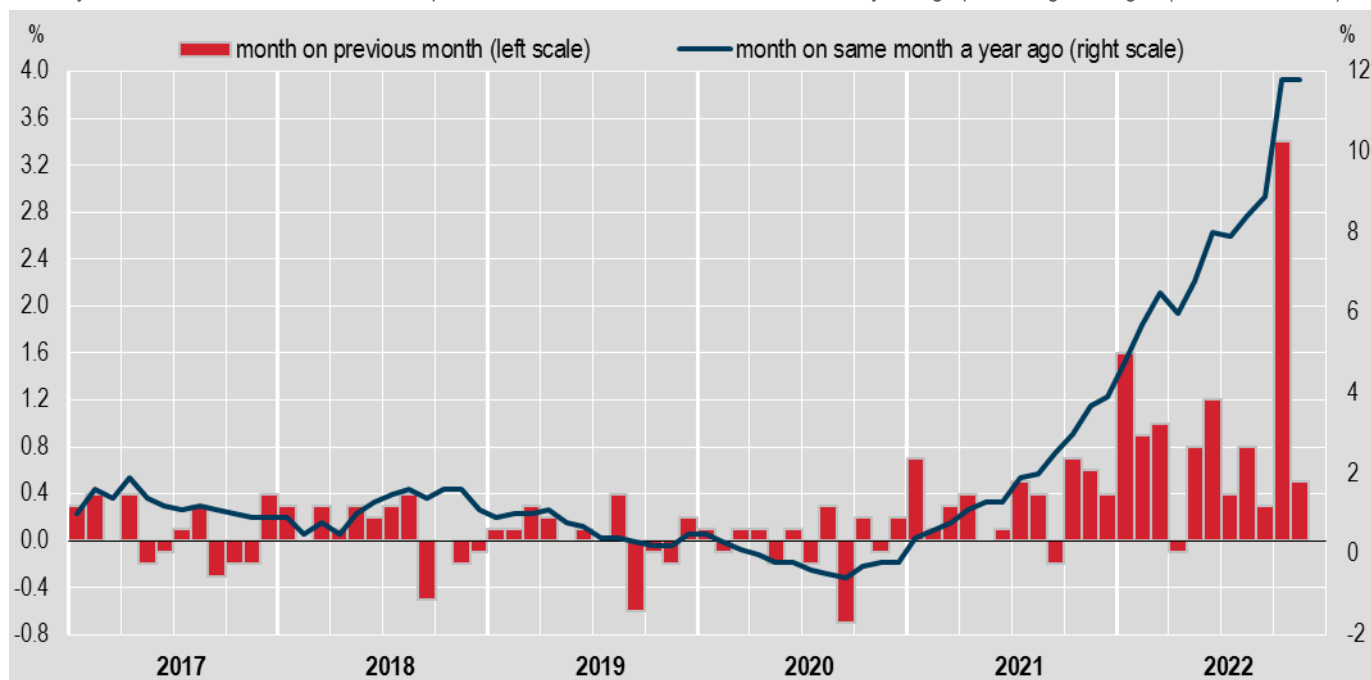
TABLE 1. ITALIAN CONSUMER PRICE INDICES
November 2022, indices, month on previous month and month on same month a year ago percent changes (index, 2015=100)

	INDICES	Month on previous month	Month on same month a year ago
	November 2022	Nov-22 / Oct-22	Nov-22 / Nov-21
Italian consumer price index for the whole nation (NIC)	118.7	+0.5	+11.8
Italian harmonized index of consumer prices (HICP)	120.7	+0.6	+12.5

TABLE 2. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC) BY ECOICOP DIVISION
November 2022, weights, indices, month on previous month and month on same month a year ago percent changes (index, 2015=100)

DIVISIONS	Weights	Indices	Month on previous month		Month on same month a year ago	
			Nov-22 / Oct-22	Nov-21 / Oct-21	Nov-22 / Nov-21	Oct-22 / Oct-21
Food and non-alcoholic beverages	183,676	121.8	+0.9	+0.8	+13.6	+13.5
Alcoholic beverages, tobacco	34,038	112.4	+0.4	+0.1	+2.5	+2.2
Clothing and footwear	63,855	106.1	+0.3	+0.2	+3.1	+3.0
Housing, water, electricity, gas and other fuels	109,684	180.7	+2.2	+2.7	+56.3	+57.0
Furnishings, household equipment and routine household maintenance	79,950	110.3	+0.5	0.0	+7.6	+7.0
Health	88,946	103.8	+0.1	0.0	+0.9	+0.8
Transport	144,843	119.1	0.0	+1.2	+6.8	+8.1
Communication	25,749	77.9	-0.4	-1.2	-1.5	-2.4
Recreation and culture	70,540	103.0	+0.3	-0.1	+2.4	+2.0
Education	10,835	82.1	0.0	+0.1	+0.9	+1.0
Restaurants and hotels	93,754	116.0	-0.8	-1.0	+7.9	+7.6
Miscellaneous goods and services	94,130	111.7	+0.4	+0.1	+3.3	+3.0
ALL ITEMS	**1,000,000**	**118.7**	**+0.5**	**+0.6**	**+11.8**	**+11.8**

CHART 2. ITALIAN NATIONAL CONSUMER PRICE INDEX (NIC) BY COICOP DIVISION
November 2022, month on same month a year ago percentage changes (index, 2015=100)
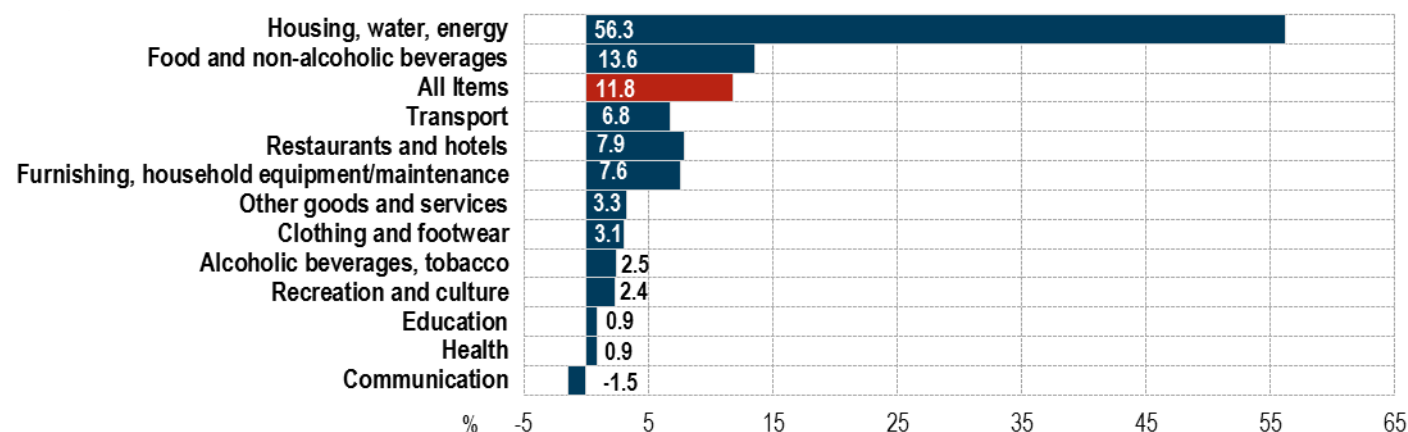
TABLE 3. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC), BY TYPE OF PRODUCTS

November 2022, weights, indices, month on previous month and month on same month a year ago percent changes (index, 2015=100)

SPECIAL AGGREGATES	Weights	Indices	Month on previous month		Month on same month a year ago	
			Nov-22 Oct-22	Nov-21 Oct-21	Nov-22 Nov-21	Oct-22 Oct-21
Food including alcohol:	195,333	121.1	+1.0	+0.8	+13.3	+13.1
Processed food including alcohol	120,047	118.6	+1.5	+0.6	+14.4	+13.3
Unprocessed food	75,286	124.6	0.0	+1.4	+11.3	+12.9
Energy:	92,494	207.8	+2.3	+4.6	+67.3	+71.1
Regulated energy products	17,411	206.7	+3.0	+0.1	+56.1	+51.6
Non-regulated energy products	75,083	202.5	+2.2	+7.9	+69.9	+79.4
Tobacco	22,381	113.6	0.0	0.0	0.0	0.0
Non energy industrial goods:	270,978	105.8	+0.3	-0.1	+5.0	+4.6
Durable goods	105,690	104.9	+0.2	-0.4	+6.0	+5.3
Non-durable goods	70,411	106.9	+0.6	+0.2	+5.6	+5.2
Semi-durable goods	94,877	105.6	+0.3	+0.2	+3.3	+3.2
Goods	**581,186**	**125.5**	**+1.0**	**+1.0**	**+17.5**	**+17.6**
Services related to housing	76,842	106.0	+0.2	0.0	+2.1	+1.9
Services related to communication	17,859	91.6	+0.2	+0.1	+0.2	+0.1
Services related to recreation, including repair and personal care	143,087	111.9	-0.4	-0.7	+5.5	+5.2
Services related to transport	64,440	114.5	-0.2	+0.2	+6.8	+7.2
Services - miscellaneous	116,586	108.0	+0.3	+0.1	+2.1	+1.9
Services	**418,814**	**109.2**	**-0.1**	**-0.1**	**+3.8**	**+3.8**
ALL ITEMS	**1,000,000**	**118.7**	**+0.5**	**+0.6**	**+11.8**	**+11.8**
All items excluding energy and unprocessed food (Core inflation)	832,220	109.7	+0.4	0.0	+5.7	+5.3
All items excluding energy, food, alcohol and tobacco	689,792	108.0	+0.1	0.0	+4.2	+4.2
All items excluding energy	907,506	110.8	+0.3	+0.1	+6.1	+5.9
Grocery and unprocessed food	220,483	119.5	+1.0	+0.8	+12.8	+12.6

CHART 3. ITALIAN NATIONAL CONSUMER PRICE INDEX (NIC) BY TYPE OF PRODUCTS

January 2017 – November 2022, month on same month a year ago percentage changes (index, 2015=100)
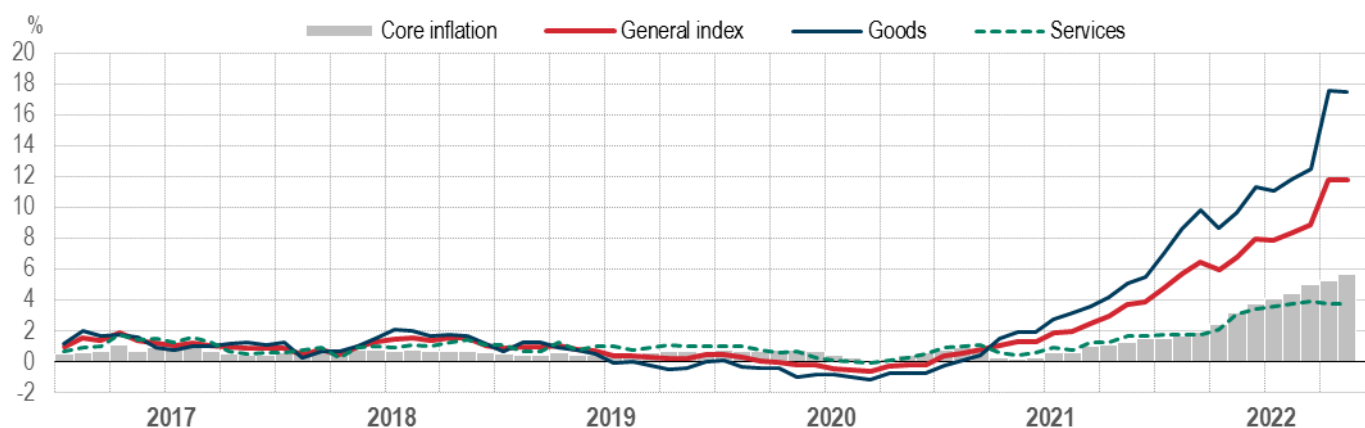
TABLE 4. ITALIAN HARMONIZED CONSUMER PRICE INDEX (HICP), BY ECOICOP DIVISION
November 2022, weights, indices, month on previous month and month on same month a year ago percent changes (index, 2015=100)

DIVISIONS	Weights	Indices	Month on previous month		Month on same month a year ago	
			Nov-22 Oct-22	Nov-21 Oct-21	Nov-22 Nov-21	Oct-22 Oct-21
Food and non-alcoholic beverages	194,554	122.1	+1.0	+0.8	+13.8	+13.6
Alcoholic beverages, tobacco	36,056	112.3	+0.4	0.0	+2.6	+2.2
Clothing and footwear	73,176	115.4	0.0	+0.4	+2.9	+3.2
Housing, water, electricity, gas and other fuels	116,179	180.8	+2.1	+2.8	+56.3	+57.2
Furnishings, household equipment and routine household maintenance	84,989	110.4	+0.8	+0.3	+7.6	+7.0
Health	46,145	104.9	+0.2	+0.1	+1.3	+1.2
Transport	153,242	119.1	+0.1	+1.2	+6.8	+8.0
Communication	27,265	78.0	-0.4	-1.2	-1.5	-2.4
Recreation and culture	57,663	104.1	+0.3	0.0	+3.0	+2.7
Education	11,474	82.0	0.0	0.0	+0.9	+0.9
Restaurants and hotels	99,319	116.1	-0.7	-1.0	+7.9	+7.5
Miscellaneous goods and services	99,938	112.1	+0.4	+0.3	+3.3	+3.1
ALL ITEMS	**1,000,000**	**120.7**	**+0.6**	**+0.7**	**+12.5**	**+12.6**

TABLE 5. ITALIAN HARMONIZED CONSUMER PRICE INDEX (HICP) BY SPECIAL AGGREGATES
November 2022, weights, indices, month on previous month and month on same month a year ago percentage changes (index, 2015=100)

SPECIAL AGGREGATES	Weights	Indices	Month on previous month		Month on same month a year ago	
			Nov-22 Oct-22	Nov-21 Oct-21	Nov-22 Nov-21	Oct-22 Oct-21
Food, alcohol and tobacco:	230,610	120.6	+0.9	+0.7	+12.0	+11.8
Processed food (including alcohol and tobacco)	159,028	118.2	+1.4	+0.4	+12.4	+11.3
Unprocessed food	71,582	125.2	-0.2	+1.4	+11.3	+13.1
Energy	97,164	208.9	+2.3	+4.7	+67.8	+71.7
Non-energy industrial goods	284,285	109.9	+0.5	+0.1	+5.3	+4.9
Services	387,941	109.7	-0.1	-0.1	+4.3	+4.3
ALL ITEMS	**1,000,000**	**120.7**	**+0.6**	**+0.7**	**+12.5**	**+12.6**
All items excluding energy and unprocessed food (Core inflation)	831,254	111.4	+0.5	0.0	+6.2	+5.7
All items excluding energy, food, alcohol and tobacco	672,226	109.7	+0.1	0.0	+4.7	+4.6
All items excluding energy	902,836	112.4	+0.4	+0.2	+6.5	+6.4

COICOP: classification of individual consumption by purpose.

Core inflation: it is calculated by excluding unprocessed food and energy.

Durable goods: they include cars, furnitures and appliances.

ECOICOP: European classification of individual consumption by purpose, which provides a level of detail (the sub-classes) greater than the COICOP.

Food: in addition to products such as bread, meat, cheese, it includes non-alcoholic and alcoholic beverages. The *Processed food* destined for final consumption are defined as the result of a process of industrial transformation (such as fruit juices, sausages, frozen products). *Unprocessed food* are fresh food (such as fresh meat, fresh fish, fruit and fresh vegetables).

Grocery and unprocessed food: it includes, in addition to food, the goods for cleaning and ordinary maintenance of the house and personal hygiene and beauty products.

HICP: harmonized index of consumer prices for the countries of the European Union.

HICP-SA: Harmonized indices of consumer prices for special aggregates. They are indicators compiled according to a different classification scheme from the ECOICOP-HICP and from that used for the NIC indices by product type. The classification scheme and calculation method are common to those used by Eurostat. From the dissemination of January 2019 definitive data, coherently with Eurostat strategy, the method of calculation of the special aggregates of the Italian HICP has changed and they are obtained by aggregating the indices of the ECOICOP subclasses (previously, for the calculation of these indicators the class indices were used). Series of the new SA indices were recalculated from January 2017, replacing the old ones and they are available on http://dati.istat.it/.

HICP-CT harmonized index of consumer prices with constant taxation for the countries of the European Union.

Inflation: it measures the temporal changes of prices of a basket of products that represents all the goods and services intended for the final consumption of households and purchasable on the market through monetary transactions.

Non energy industrial goods: they include consumer goods excluding food, energy and tobacco products.

Non-durable goods: they include housecleaning detergents, personal care products and medicines.

Regulated energy products: they include the tariffs for electricity - regulated market and gas for domestic use.

Regulated products: they include regulated energy products and other regulated products.

Semi-durable goods: they include clothing, footwear, books.

Non-regulated energy products: they include fuels for motor vehicles, lubricants, non regulated fuels for domestic use and electricity - liberalized market.

NIC: italian consumer prices index for the whole nation.

Services related to housing: they include services for repair, cleaning and maintenance of the house, refuse collection, rents, maintenance charges in multi-occupied buildings, water supply and sewerage collection.

Services related to communication: they include telephone services and postal services.

Services related to recreational, including repair and personal care: they include holiday packages, accommodation services, restaurants, bars and the like, canteens, repair of audiovisual, photographic and IT equipment, clothing services, services for personal hygiene, recreational and cultural services and games of chance.

Services related to transport: include air, sea, rail and road transports, maintenance and repair of personal transport equipment, insurance connected with transport.

Services - miscellaneous: they include education, medical services, social protection, financial services; Legal services and accountancy; funeral services, insurance connected with health.

Short-term percentage change: change compared to the previous period.

Trend percentage change: change compared to the same period of the previous year.

Introduction and regulatory framework

The consumer price indices measure the variations over time of the prices of a collection of products (basket) that represents all the goods and services intended for the final household consumption, obtainable on the market through monetary transactions (free transactions, own-consumptions, imputed rentals for housing, etc. are excluded).

The system of consumer price indices consists of two different indicators[1]:

▶ **the Consumer Price Index for the whole nation (NIC)** is used as a measure of headline inflation;

▶ **the Harmonized 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. In compliance with the European legislation, and consistently with the standards provided by the regulations, the HICP index is also processed in the "constant taxation" version (HICP-CT).

▶ The HICP index is calculated and issued on the reference base of 2015=100 (Regulation (EU) 2016/792 of the European Parliament and of the Council). The same reference year is also used for the NIC index.

The survey of consumer prices indices is governed by different laws and regulations that define the actors involved (Italian National Institute of Statistcs - Istat and Municipalities) and their relative functions:

* the Regio Decreto Legge n. 222/1927, that gives Istat the task, of promoting the formation of price indices in all municipalities with more than 100,000 inhabitants and in others municipalities chosen among the provincial capitals or those with more than 50,000 inhabitants that have adequate statistics offices;
* the Law n. 621/1975 amends the Regio Decreto Legge n. 222/1927 with regard to the municipalities which are responsible for conducting the consumer price survey, as follows: "among the municipalities referred to in art. 1… must be understood to include all the provincial capital municipalities and those with over 30,000 inhabitants who have a suitable statistical office";
* D.lgs n. 322/1989, that governs the survey, processing, analysis and dissemination activities, and archiving statistical data performed by public authorities and bodies of statistical information, for the purpose of creating the single direction, organizational consistency and the streamlining of flows at a central and local level;
* the Regulation (EU) 2016/792, concerning the harmonized index of Consumer Prices and the House Pice index (HPI), and the Commission Implementing Regulation (EU) 2020/1148 of 31 July 2020.

Survey coverage and organization

Data contributing to the calculation of monthly consumer price indices are collected using different sources: the *local survey*, carried out by municipal statistics offices, under Istat supervision and coordination; the *central survey* carried out directly by Istat or through different data providers; the *scanner data*; the *administrative sources*.

In 2022, the weight of the products exclusively collected through the local survey is equal to 51.7% and that of products collected through the central survey is 22.3%. In addition to these two ways the acquisition of elementary prices (for grocery products) is carried out through scanner data with regard to the retail trade modern distribution channels that are hypermarkets, supermarkets, discounts, small sales areas and specialist drug (for 12.9% in terms of weight), where traditional data collection is no longer carried out. For some products (weighing 4.5%), prices are collected in a mixed way. In addition, tobacco prices are collected from Customs and Monopolies Agency for the detection of tobacco (2.2% of the basket) and, starting this year, house rent prices are provided by the Real Estate Market Observatory of the Revenue Agency (2.7% of the basket). For the remaining 3.7% of the basket price quotations are collected using by mixed techniques.

In 2022, the geographical basis of the survey is made up of 80 municipalities, which contribute to the indices calculation of all the product aggregates included in the basket. Other 12 municipalities participate 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 (sport events, cinemas, theatre shows, secondary school education, canteens in universities, etc.).

In the 92 municipalities (80 for the full basket and 12 for a subset of products) taking part in the 2022 survey, prices are collected in about 43,000 statistical units (including outlets, enterprises and institutions) and rents are collected for about 2,200 dwellings for social housing. 392,000 price quotes are sent by Municipal Offices of Statistics to

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[1] A third indicator, the "household of workers and employees consumer price index" (FOI), which refers to the consumption of the whole households headed by an employed worker, is also calculated (as a satellite index of NIC) and released by Istat on monthly basis.

Istat each month (390,000 in 2020). Following the annual update of the municipal survey plans, 4.9% of the current price quotes are new (6.7% in 2021): of these, 2.2% are price quotes of new products, while the remaining 2.7% refers to products already in 2021 basket.

In 2022, prices/quotes collected each month directly by Istat are more than 100,000, thereof: over 100,000 via web, also using web scraping techniques or collecting data from different providers, about 400 quotes directly provided by insurance companies (which refer to protection against most risks connected to property, such as fire, theft and other damages and are used for the Housing insurance services price index compilation) and more than 700 detected by internal sources.

Since 2018, Istat has been using scanner data of grocery products (excluding fresh food) in the production process of the consumer price indices. A probabilistic sampling is used for the selection of outlets and the dynamic approach has been implemented to the selection of the elementary items. At present, scanner data feed the calculation of 84 sub-indices ("aggregate of products") belonging to six ECOICOP Divisions (Food and non-alcoholic beverages; Alcoholic beverages, tobacco; Furnishings, household equipment and routine household maintenance; Health; Recreation and culture; Miscellaneous goods and services).

In agreement with large scale retail trade chains (RTCs) and with the fruitful collaboration of the Association of Modern Distribution and Nielsen, Istat receives scanner data for 4,007 outlets, including 471 hypermarkets, 1,453 supermarkets, 567 discounts, 1,000 outlets with surface between 100 and 400 s.m. and 516 specialist drug. These outlets belong to the main 21 RTCs and they cover the entire national territory. Istat receives scanner data on a weekly basis at item code level. The sample of outlets is stratified by provinces (107) and retail trade channels (5).

More than 19 million price quotes are collected each week to estimate inflation. For each barcode (GTIN), prices are calculated taking into account turnover and quantities (weekly price=weekly turnover/weekly quantities). Monthly prices are calculated as the arithmetic mean of weekly prices weighted with quantities.

Concerning the selection of the sample of items, a dynamic approach has been adopted. Specifically, in each month a sample of GTINs is selected within each outlet and ECR[2] market (representative of elementary aggregates). A set of filters have been implemented to select the matched sample each month comparing the current month with the preceding month. In January, the sample includes more than 11 million references thereof about 30 million elementary prices enter the indices compilation.

Scanner data indices of ECR market are calculated at outlet level as unweighted Jevons index (geometric mean) of GTINs elementary indices. The ECR market indices are then linked to the base period (December of the previous year). In turn, provincial indices of ECR market are calculated as the weighted arithmetic means using sampling weights of outlets and turnover by retail trade channel. Finally, provincial indices of aggregate of products are calculated as the weighted arithmetic mean of ECR markets using expenditure shares (referred to one year before) for the weights.

The administrative data sources for the calculation of consumer prices are several. Among these are those relating to tobacco whose data are provided by the Excise, Customs and Monopolies Agency (ADM). The indices calculated relate to three products: Cigarettes, Cigars and cigarillos and Other tobacco (shredded for cigarettes, snuff and chewing tobacco, other smoking tobacco, inhalation tobacco). The sample and the weighting system are obtained on the basis of the annual sales value of the main manufactured tobacco products on the market.

Starting from 2017 also the automotive fuels price indices are calculated from administrative data using the database supplied by the Ministry of Economic Development that collects prices for these products. In 2022, more than 68,000 price quotes are monthly used to estimate inflation and they come from about 12,800 fuel stations on the territory that is 66.8% of the ones present in Ministry database. The sample of fuel stations covers the geographical areas of country. Specifically: around 3,600 are located in the North-West; more than 3,000 in the North-East and in the Centre; around 2,700 in the South and more than 1,400 in the Islands.

Starting from 2022 the estimation of private housing rents index is based on administrative data in particular rents contracts database provided by the Real Estate Market Observatory of the Revenue Agency. The production of the indices benefits from the collaboration of the Central Directorate for Real Estate Market Observatory and Estimating Services (OMISE) of the Revenue Agency. The new data source contains information about rents contracts registered in the reference quarter. Only contracts where the property owner is a person and referring to some cadastral categories (civil properties, economic properties and popular properties) are used for inflation estimation. Stratification has been carried out for index calculation.

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[2] ECR markets are the lowest level of the ECR classification (classification shared by industrial and distribution companies) and they have been linked to the aggregates of product of ECOICOP classification.

Calculation of indices

Weighting structure

Not all goods and services included in the basket have the same importance in households' budget. Consequently, for the compilation of the consumer price index, weights are used that reflect the expenditure shares of different products on final consumption expenditure.

The weighting coefficients of indices are determined on the basis of the values of the household final consumption expenditure and of the household final monetary consumption expenditure (for HICP), as derived from National Accounts. Additional information used to define weights is originated from the Household Budget Survey, from other Istat surveys and from external sources, which have an auxiliary function, such as Ac Nielsen and GfK Italia S.r.l..

The COVID-19 pandemic had a significant impact on the consumption expenditure of households who are adjusting their consumption habits to the new circumstances. Therefore, for the estimation of the weighting coefficients, it was decided, also in accordance with the guidelines drawn up by Eurostat, to use the most recent National Accounts data available, i.e. the data relating to year 2021. It should be emphasized that, for reasons of timeliness, the weight system used for the preliminary estimate of inflation for January 2022 was calculated on the basis of the National Accounts data available last December, relating to the first three quarters of the year. The extension of the information to cover the entire calendar year, available at the beginning of February 2022, allowed a further refinement of the weighting structures on the occasion of the dissemination of the definitive indices.

Price changes of goods and services included in the basket contribute to the calculation of the All-item index with their own weight in terms of the expenditure share sustained by households to purchase them. However, in order to measure the expenditure shares with reference to the value of the computation base period of indices (December 2021), household final consumption data, were price-updated using the price changes measured between the average of year 2021 and December 2021.

Table 1 shows the 2022 final weighting structures by expenditure division of NIC and HICP used to calculate the preliminary estimates of inflation of January 2022.

TABLE 1. WEIGHTS USED TO CALCULATE CONSUMER PRICE INDICES BY EXPENDITURE DIVISION.
Year 2022, percentage values

EXPENDITURE DIVISIONS	NIC	HICP
Food and non-alcoholic beverages	18.3676	19.4554
Alcoholic beverages, tobacco	3.4038	3.6056
Clothing and footwear	6.3855	7.3176
Housing, water, electricity, gas and other fuels	10.9684	11.6179
Furnishings, household equipment and routine household maintenance	7.9950	8.4989
Health	8.8946	4.6145
Transport	14.4843	15.3242
Communication	2.5749	2.7265
Recreation and culture	7.0540	5.7663
Education	1.0835	1.1474
Restaurants and hotels	9.3754	9.9319
Miscellaneous goods and services	9.4130	9.9938
ALL ITEMS	**100.0000**	**100.0000**

Aggregation of national and territorial indices

The consumer price indices are calculated through subsequent aggregations of the indices of product aggregates compiled at provincial level.

In detail, the *national All-items index* is compiled as follows:

▶ the provincial indices of product aggregates are aggregated to build the corresponding regional indices. The weighting coefficients used are based on the weight of each provincial capital in terms of resident population;

▶ the regional indices of product aggregate are aggregated to build the corresponding national indices. The weighting coefficients used are based on the weight of each region in terms of household consumption;

▶ the All-items index is obtained as the weighted average of the national indices of product aggregates. The weighting coefficients used are based on expenditure shares of each product aggregate.

The *All-items index at provincial, regional and macro-regional level:*

▶ the All-items indices *by regions and macro-regions* are obtained as the weighted average of the regional indices of product aggregates. The weighting coefficients used are based on the weight of each component in terms of household consumption, defined at regional and macro-regional level.

▶ The All-items indices *by provinces* are compiled as the weighted average of provincial indices of product aggregates. The weighting coefficients used are based on the weight of each aggregate of product in terms of household consumption, defined at a regional level.

Classification of consumer prices indices

Classification of consumption so far used for HICP and NIC is the international classification ECOICOP (European Classification of Individual Consumption by Purpose), whose hierarchical structure has 4 levels of disaggregation: Divisions, Groups, Classes and Subclasses of product.

The classification ECOICOP was adopted in 2016, in compliance with the new European framework regulation on harmonized indices of consumer prices and the house price index (2016/792).

For the calculation of Italian consumer price indices, subclasses of product are further broken down in Consumption segments and Product aggregates.

Consumption segments are the most disaggregated level for which NIC indices referring to the entire national territory are disseminated. Concerning HICP indices, the level of detail of the dissemination is that of the classes of product (the dissemination of HICP subclass indices is expected to start in 2020). At local level (geographical area, region, province), NIC indices are published up to the product groups.

HICP indices by special aggregates (**HICP-SA**) are released too. HICP-SA indices are calculated using the same classification scheme and method adopted by Eurostat (therefore different from the method used for the calculation of NIC indices by types of product), 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[3]. From the dissemination of January 2019 definitive data, coherently with Eurostat strategy, the method of calculation of the special aggregates of the Italian HICP has changed and they are obtained by aggregating the indices of the ECOICOP subclasses (previously, for the calculation of these indicators the class indices were used). Series of the new SA indices were recalculated from January 2017, replacing the old ones.

Survey and calculation of prices indices of seasonal products

From January 2011, the prices of *Fruit*, *Vegetables*, *Clothing* and *Footwear* are collected and processed in accordance before with Regulation (EC) no 330/2009 of 22 april 2009 and then with Regulation (EU) 2020/1148 of 31 July 2020 (that repealed the Regulation 330/2009), where minimum standards are established to deal with seasonal products in the HICP[4]. The same method is also used for the NIC[5]. In particular, the European Regulation defines as *seasonal product* an individual product that is available for purchase or purchased in significant amounts only part of a year in a recurring pattern. It also establishes that in a given month seasonal products are considered *in season* (at least one month) or *out of season*.

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[3] 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=COICOP_5&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC.
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 Istat statistics, inside the theme "Prices".
[4] It has been adopted starting from data referred to January 2011.
[5] It is used for FOI indices, too.

On the basis of this standard, Istat defines a monthly calendar for the whole year, which establishes, in a given month, when each specific product belonging to the above mentioned 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 when 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.

Methods for the imputation of missing prices

For the inflation estimates, the imputation of missing prices is accomplished by specific procedures in compliance with the European regulations and recommendations[6]. These procedures, which apply to all the three indices (NIC, FOI and HICP), are founded on three principles:

1. fixed weight approach for the elementary aggregates in the basket,
2. compilation of all the indices of the ECOICOP and the further sub-levels indices laid down by the national classification,
3. minimizing the number of imputed prices[7].

The imputation procedures apply whenever prices are missing, in which case the missing prices are generally estimated basing on the monthly rate of change or, in specif cases, on the annual rate of change of the collected price information. In practice, the way in which imputations are carried out depends on various factors (including the degree of monthly volatility of the prices or its seasonal dynamics). Broadly speaking, the procedures used for imputing prices follow three criteria:

a) whenever it is possible, the imputation is based on the monthly rate of change of the same aggregate of products in another geographic area, or the most similar aggregate of product in the same classification level, or the monthly change of the index of the higher aggregation level in the classification structure;

b) when appropriate, missing prices can be estimated by carrying forward the last available price;

c) alternatively, for the products that are not available at all in the market and that show a clear seasonal profile, the imputation is carried out considering the average rate of change of all items index calculated excluding these products.

With reference to specific groups of products, the imputations rules are the following:

a. For grocery products collected by data scanner, coherently with the dynamic approach used to calculate the indices and in accordance with Eurostat guidelines, the prices of temporarily missing references (due to seasonal or accidental reasons) are imputed for a maximum 14 consecutive months. In particular, missing prices are estimated using the monthly growth rate of the others references in the same stratum or of the higher level index according to the aggregation rules[8].

b. For clothing and footwear and for fresh food products such as fresh fruit and vegetables collected bi-monthly, if the prices are missing, they are imputed basing on the monthly rate of the prices of the references that have been collected for the same product in the provincial capital, or in the region or at national level, applying the usual procedures for imputing the prices of seasonal products.

c. For fresh food products (collected monthly), fresh fish products (collected bi-monthly), SOP, OTC drugs and other medical products (collected monthly) by the UCS, missing prices are estimated using the m/m rate of change of the prices of the references of the same product in the provincial capital or in the region or at national level.

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[6] During the health emergency due to the spread of Covid-19, the set of procedures to impute the missing prices was reviewed, in cooperation with the other national statistical institutes of the countries of the European Union and under the Eurostat coordination, to take into account the criticalities that emerged in relation to data collection in the pandemic phase. In particular, with reference to the activity carried out by the UCS on the national territory, higher percentages of data missing were observed compared to the pre-pandemic period, due to the closure of most of the commercial activities offering consumer goods and services or contingent accesses to the open ones.

[7] The rule of minimizing the number of prices imputed implies that, in the selection of the products that make up the basket, the actual families' willingness to purchase them must be taken into account.

[8] The same procedure applies to the case of estimating outliers prices.

d. For the accommodation services in hotel, missing prices are estimated using the m/m rate of change of the prices collected in other hotels (same category, if possible) of the province. In case all (or almost all) price information is lacking, missing prices are imputed using the m/m rate of change of the hotels of the province in the same month of the previous year, in order to preserve the seasonal dynamics of this products aggregate; for the bed and breakfast the missing prices are estimated using the m/m rate of change of the prices collected in the province or, if all (or almost all) the observations are missing, prices are estimated using the m/m rate of change of the same month in the previous year, in order to preserve the seasonal dynamics of this products aggregate.

e. The carry forward method (repetition of the previous month's price) is applied to the prices of furnishings and household products, given the limited temporal variability and the lack of seasonal profile of the prices of this category of products.

f. The carry forward method is applied also to the prices of restautants, cultural and recreational services;

g. For products collected centrally by Istat, missing prices are estimated using the monthly rate of change of the indices belonging to the same stratum; if the prices of a stratum are all missing, the estimation procedure is based on the variation of the indexes of the upper stratum.

The indices at different levels of aggregation, when their rate of imputations is higher than 50% (in terms of missing prices and/or their weight), on the basis of Eurostat indications, are market by using the flag "I" (data imputated) both in the tables of the press release and in I.Stat and in any other publications. With regard to the indices released on Rivaluta, on the occasion of the release of the definitive data, those with a rate of imputations higher than 50% (in terms of missing prices and/or weight) are not made available.

Flash estimates of HICP: accuracy and computation methodology

Flash estimate of Italian HICP (and NIC) are usually published on the last working day of the reference month according to the Eurostat release calendar of HICP flash estimate for euro area. Final data are generally published around 15 days later.

The aim of the inflation flash estimates is to provide a timely information on inflation, predicting as accurately as possible the final HICP (and NIC) annual rate of change released about two weeks later. The analysis of their revisions represents an important tool to evaluate the correct balancing between the two quality dimensions, timeliness and accuracy.

In line with the Eurostat Statistics Explained on Inflation – methodology of the euro area flash estimate, this section analyses the accuracy of the Italian HICP flash estimates and describes the methodology used in their computation.

Accuracy of flash estimates

Table 2 compares the final HICP annual rates of change and the flash estimates for the same reference month. Over the last thirteen months, the maximum difference between the final HICP and the flash estimate all item annual rates of change was -0.3 percentage points recorded in April 2022. Over the same period, with reference to the main special aggregates, the widest differences between final HICP annual rates of change and the flash estimates concerned Processed food (including alcohol, tobacco) (-0.4 percentage points in April 2022), Energy (1.9 in October 2021, -2.0 in March 2022, -2.8 in April 2022 and -2.2 this month) and Non energy industrial goods (-0.8 in January 2022 and +0.3 in August 2022).

The highest frequency of revisions is observed for Processed food, including alcohol and tobacco (9 months out of 13 months considered, due to the use in the flash estimate of scanner data referred to the prices of grocery products from the large scale retail trade distribution of one/two weeks compared to the three weeks included in the final index), for Energy (8 months out of 13) and for Non energy industrial goods (7 months out of 13, mainly due to the seasonal sales dynamics of Clothing and footwear and to the availability for the flash estimate, for some durable goods, of the data referring to one or two weeks compared to the three included in the final index); in particular for the first two special aggregates the partial information available has a higher impact on the flash estimate that thus turns out to be less accurate.

methodological**note**

TABLE 2. FLASH ESTIMATES AND HICP ANNUAL RATES FOR THE ALL-ITEMS AND MAIN SPECIAL AGGREGATES
October 2021 – October 2022, percentage values (base 2015=100)

Special aggregates		Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22
Food including alcohol and tobacco:	**Flash**	1.1	1.4	2.5	3.4	4.3	5.1	5.8	6.5	8.0	8.8	9.3	10.4	11.9
	HICP	0.9	1.2	2.5	3.2	4.2	5.0	5.5	6.4	7.9	8.8	9.2	10.2	11.8
Processed food (including alcohol. tobacco)	**Flash**	1.3	1.4	1.7	2.1	2.8	3.4	4.6	5.7	7.0	8.1	8.9	10.0	11.3
	HICP	1.0	1.2	1.7	1.9	2.7	3.4	4.2	5.6	6.9	8.1	8.8	9.8	11.3
Unprocessed food	**Flash**	0.9	1.4	3.9	6.1	7.7	8.8	8.7	8.6	10.3	10.1	10.1	11.4	13.1
	HICP	0.9	1.4	4.0	6.1	7.8	8.8	8.7	8.6	10.3	10.1	10.1	11.4	13.1
Energy	**Flash**	23.4	31.2	29.6	39.0	46.4	53.5	42.8	42.6	49.1	43.3	45.4	45.0	73.9
	HICP	25.3	31.2	29.6	39.1	46.5	51.5	40.0	42.9	49.1	43.4	45.4	45.0	71.7
Non energy industrial goods	**Flash**	0.9	0.8	1.1	1.1	1.3	1.8	2.1	2.6	3.0	2.5	3.8	4.4	4.8
	HICP	0.8	0.6	1.1	0.3	1.4	1.8	2.1	2.6	2.9	2.5	4.1	4.4	4.9
Services	**Flash**	1.3	1.7	1.8	1.9	2.0	1.9	2.3	3.3	3.7	4.0	4.0	4.4	4.2
	HICP	1.3	1.7	1.8	2.0	1.9	2.0	2.4	3.3	3.7	4.0	4.0	4.4	4.3
All-items	**Flash**	**3.1**	**4.0**	**4.2**	**5.3**	**6.2**	**7.0**	**6.6**	**7.3**	**8.5**	**8.4**	**9.0**	**9.5**	**12.8**
	HICP	**3.2**	**3.9**	**4.2**	**5.1**	**6.2**	**6.8**	**6.3**	**7.3**	**8.5**	**8.4**	**9.1**	**9.4**	**12.6**
All items excluding energy and unprocessed food (Core inflation)	**Flash**	1.3	1.4	1.5	1.8	1.9	2.1	2.7	3.4	4.1	4.3	4.8	5.4	5.7
	HICP	1.2	1.3	1.5	1.5	1.9	2.1	2.6	3.4	4.0	4.3	4.9	5.3	5.7
All items excluding energy. food. alcohol and tobacco	**Flash**	1.3	1.4	1.5	1.6	1.7	1.8	2.2	2.9	3.4	3.4	3.9	4.4	4.5
	HICP	1.2	1.3	1.5	1.3	1.7	1.8	2.2	3.0	3.4	3.4	4.1	4.4	4.6
All items excluding energy	**Flash**	1.2	1.4	1.8	2.0	2.3	2.7	3.1	3.9	4.6	4.8	5.2	5.9	6.4
	HICP	1.2	1.3	1.8	1.7	2.3	2.7	3.1	3.9	4.6	4.7	5.4	5.8	6.4

The Mean Absolute Deviation (MAD) provides another way to measure accuracy. It is calculated as the average of the differences in absolute value between the final HICP annual rates of change and the flash estimates over the last thirteen months. Figure 1 shows the MAD for the all-item index and the main special aggregates. Over the last thirteen months Energy (0.731 percentage points), Processed food (including alcohol, tobacco) (0.131 percentage points), and Food including alcohol and tobacco (0.131 percentage points), and Non energy industrial goods (0.131 percentage points) recorded the highest MADs.

FIGURE 1. MEAN ABSOLUTE DEVIATION BETWEEN FLASH ESTIMATES AND HICP ANNUAL RATES.
October 2021 – October 2022, percentage points
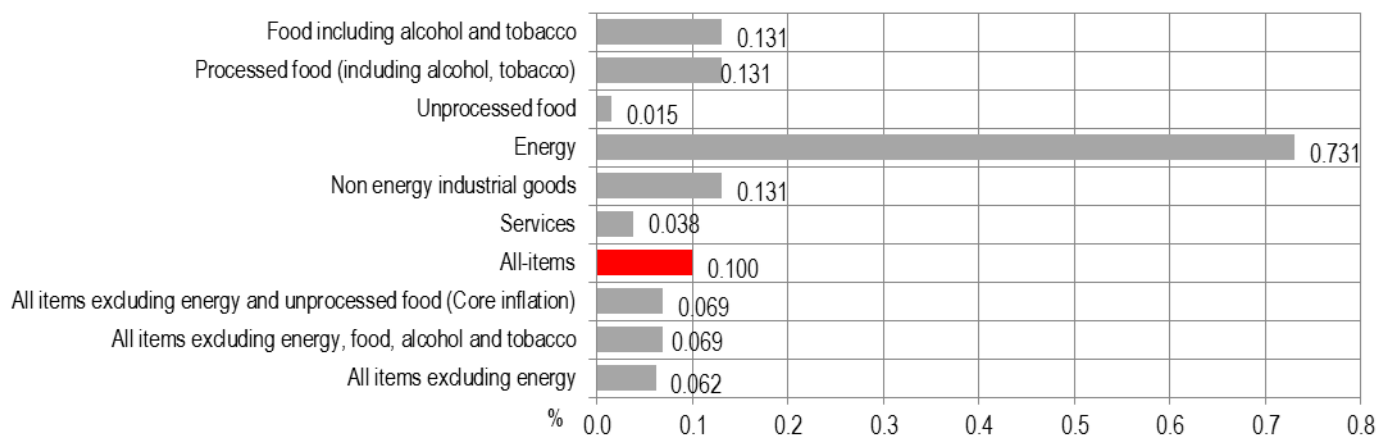
The Covid-19 crisis and the compilation of consumer price indices

The spread of Covid-19 and the restrictive measures adopted by Italian government to hinder its further diffusion caused, in March, April and May 2020, important issues to the production of the consumer price indices.

Between May and June of the last year the gradual reduction of the seriousness of the Covid-19 crisis and the gradual reopening of most of the retail trade activities supplying goods and services have limited the issues of the previous months, first of all for the clear decrease of the amount of missing observations that reached the peak in April.

Major problems concerned the data collection in the field in charge of the Municipal Statistical Offices. As regards the products for which the data collection is still carried out in the physical shops (accounting for about 50% of the total basket), it has been combined with data collection carried out by using telephone and Internet to obtain prices in the outlets of the local sample.

Concerning the other data sources (centralized data collection, scanner data, data providers and administrative data), there are no difficulties in obtaining the information needed for the index compilation. However, the introduction of restrictions in the movement of people required, in some cases, the adoption of specific solutions for the calculation of the involved price indicators.

Specifically, for the estimate of the Italian Harmonized index of consumer prices, as well as for the other national CPIs, until March 2021 imputation procedures[9] were used to deal with the higher number of missing observations, in compliance with the guidelines provided by Eurostat in agreement with the Member States.

Starting from Legislative Decree n. 52 of 22 April 2021 (the so-called Reopening Decree) most of the restrictions introduced by the government in the previous months have been gradually eliminated, allowing the reopening of almost all economic activities and the possibility of resuming mobility on the territory not dictated by reasons of strict necessity, while remaining significant limitations (also differentiated territorially) due to the need to respect social distancing and that, to a large extent, have gradually come to an end. Then, also in the current month all the commercial activities operated regularly and it was possible, for all the products in the basket, to use the prices recorded, including the prices recorded in advance for all the products for which this mode of data collection is adopted.

Dissemination: timing and database

Consumer prices indices dissemination by Istat occurs in two successive dates according to a different release method of the data: flash estimate and definitive estimate.

The dissemination of flash estimate of the NIC indices (general, by expenditure division, by product type and by purchase frequency) and the (general) HICP index occurs at the end of the reference month, while that one of the definitive data of the indices, NIC and HICP, occurs no later than the middle of the month following the reference month. The publication times are established by a https://www.istat.it/it/informazioni-e-servizi/per-i-giornalisti/appuntamenti/calendario-diffusioni-ed-eventi agreed upon with Eurostat, in the month of December of each year, for the next year, and according to the dissemination standards (SDDS – Special Data Dissemination Standard) defined by the International Monetary Fund.

Starting from the publication of the data of January 2019, the direct dissemination of the municipal indices of consumer prices is carried out by the authorized municipalities simultaneously with the dissemination of the definitive indexes by Istat.

The indices, for both flash and definitive estimates, are issued through the "Consumer prices index" press release on the Istat website at https://www.istat.it/en/archivio/consumer+prices.

The series of the updated indices are published, in conjunction with the issue of the press release, on the Istat data warehouse within the theme Prices - Consumer prices. Together with the monthly indices, the short-term and trend percentage variations, the average annual indices, the average annual variations and the annually calculated weights are issued. The indices at various levels of aggregation and for different territorial areas that have had a share of imputations higher than 50% (in terms of missing prices and / or weight) can be identified with the flag "i" (imputed data).

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[9] For the methodologies adopted during 2020, it is possible to consult the same paragraph available in the methodological note of the definitive estimate of December 2020 (https://www.istat.it/en/archivio/252606).

Information on the consumer price indices is available in on the EconomicTrends.Stat database, that collects and organizes the short-term statistics produced by Istat, and offers itself as a study tool for policy makers, social workers, scholars and citizens.

Information on the historic series of all indices, beginning from 1861 to 2015, is available on the Istat website at Time Series.

Summary data and studies on consumer prices and on the basket of goods and services are in addition contained in some editorial publications issued by Istat annually, such as the Statistical Yearbook, the Annual Report and publication Noi Italia.

In compliance with European Regulation No. 792/2016, the data of the survey on consumer prices is transmitted to Eurostat twice per month. The main indicators, archived in the Eurostat database, are accessible at http://ec.europa.eu/eurostat/data/database (Theme "*Economy and finance*", topic "*Prices*").

For technical and methodological information

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