

May 2021

CONSUMER PRICES

Provisional data

- According to preliminary estimates, in May 2021 the rate of change of the Italian consumer price index for the whole nation (NIC) was null compared with the previous month and +1.3% on annual basis (from +1.1% in April).
- The speed-up of All-item index was mainly due to the prices of Energy products (from +9.8% in April to +13.8%), in particular to the prices of Non-regulated energy products (from +6.6% to +12.6%), being wide but stable (+16.8% as in April) the growth of those of Regulated energy products. This dynamics was only partially offset by the trend reversal of prices of Services related to recreation, including repair and personal care (from +0.7% to -0.1%).
- Core inflation (excluding energy and unprocessed food) was +0.3%, as in April, and inflation excluding energy was +0.2% (down from +0.3% in the previous month).
- The zero increase on monthly basis was due to the prices of Non-regulated energy products (+1.1%) and of Unprocessed food (+0.9%) whose growth was offset by the decrease of prices of Services related to recreation, including repair and personal care (-0.8%).
- Prices of Grocery and unprocessed food increased by 0.4% on monthly basis and decreased by 0.8% on annual basis (from -0.7% in the previous month).
- In May 2021 the rate of change of the Italian harmonized index of consumer prices (HICP) was zero on monthly basis and +1.3% on annual basis (from +1.0% in April).
- On pages 11-12 the methodological note describes the choices adopted to deal with the ongoing issues deriving from Covid-19 crisis.

CHART 1. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC)

January 2016 – May 2021, month on previous month and month on same month a year ago percentage changes (index, 2015=100)

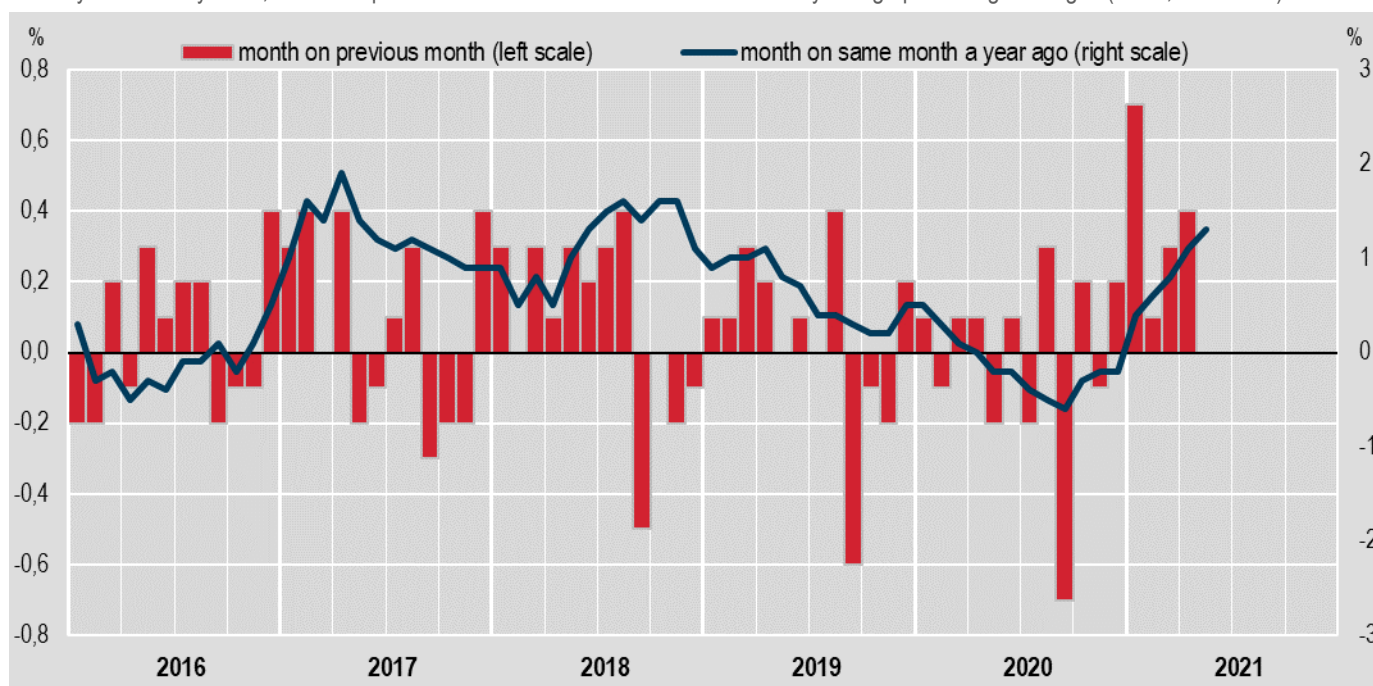


TABLE 1. ITALIAN CONSUMER PRICE INDICES

May 2021, indices, month on previous month and month on same month a year ago percentage changes (index, 2015=100)

	INDICES	Month on previous month		Month on same month a year ago	
		May-21 Apr-21	May-20 Apr-21	May-21 May-20	Apr-21 May-20
Italian consumer price index for the whole nation (NIC)	104.1	0.0		+1.3	
Italian harmonized index of consumer prices (HICP)	105.1	0.0		+1.3	

TABLE 2. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC) BY ECOICOP DIVISION

May 2021, weights, indices, month on previous month and month on same month a year ago percentage changes (index, 2015=100)

DIVISIONS	Weights	Indices	Month on previous month		Month on same month a year ago	
			May-21 Apr-21	May-20 Apr-20	May-21 May-20	Apr-21 Apr-20
			Food and non-alcoholic beverages	193,405	106.7	+0.5
Alcoholic beverages, tobacco	36,133	110.2	+0.1	+0.3	-0.2	0.0
Clothing and footwear	65,355	102.4	+0.1	0.0	+0.3	+0.2
Housing, water, electricity, gas and other fuels	111,952	104.5	+0.3	-0.4	+5.8	+5.0
Furnishings, household equipment and routine household maintenance	77,224	101.9	+0.3	+0.1	+0.6	+0.4
Health	95,512	102.6	+0.1	0.0	+1.0	+0.9
Transport	127,341	106.7	+0.2	-1.6	+4.8	+2.9
Communication	27,883	81.2	-0.4	-1.3	-2.6	-3.6
Recreation and culture	71,028	100.9	-1.2	-0.5	+0.4	+1.1
Education	10,766	81.8	0.0	(i) 0.0	-3.7	-3.7
Restaurants and hotels	82,940	106.7	-0.7	(i) +0.3	-0.1	+0.8
Miscellaneous goods and services	100,461	107.9	0.0	0.0	+1.2	+1.2
ALL ITEMS	1,000,000	104.1	0.0	-0.2	+1.3	+1.1

(i) Index calculated by imputing elementary data (not available or not usable) representing 50% and more of the weight of the aggregate.

CHART 2. ITALIAN NATIONAL CONSUMER PRICE INDEX (NIC) BY COICOP DIVISION

May 2021, month on same month a year ago percentage changes (index, 2015=100)

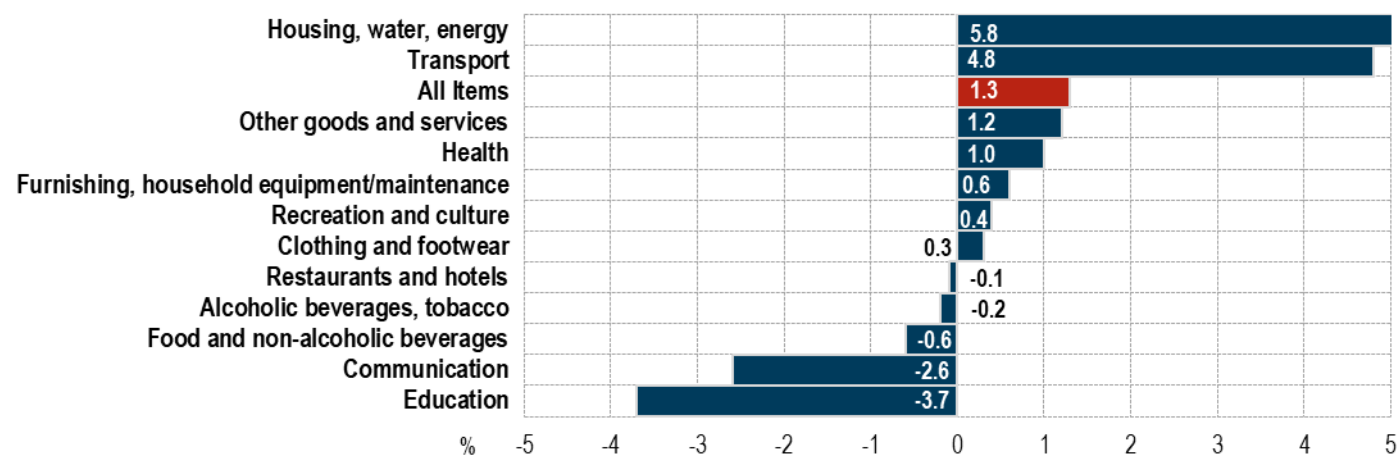


TABLE 3. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC), BY TYPE OF PRODUCTS

May 2021, 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	
			May-21	May-20	May-21	Apr-21
			Apr-21	Apr-20	May-20	Apr-20
Food including alcohol:	206,108	106.5	+0.5	+0.6	-0.7	-0.6
Processed food including alcohol	127,445	103.3	+0.2	+0.1	-0.7	-0.8
Unprocessed food	78,663	111.5	+0.9	+1.2	-0.5	-0.3
Energy:	83,480	104.8	+0.7	-2.8	+13.8	+9.8
Regulated energy products	30,130	101.5	0.0	0.0	+16.8	+16.8
Non-regulated energy products	53,350	106.7	+1.1	-4.2	+12.6	+6.6
Tobacco	23,430	113.6	0.0	+0.2	+0.7	+0.9
Non energy industrial goods:	267,520	100.8	0.0	-0.1	+0.4	+0.3
Durable goods	97,748	99.5	-0.1	-0.1	+0.9	+0.9
Non-durable goods	71,239	101.2	+0.1	0.0	-0.1	-0.2
Semi-durable goods	98,533	101.6	0.0	0.0	+0.2	+0.2
Goods	580,538	103.7	+0.2	-0.3	+2.0	+1.5
Services related to housing	80,612	103.5	0.0	0.0	+0.9	+0.9
Services related to communication	19,708	91.6	0.0	+0.1	+0.9	+1.0
Services related to recreation, including repair and personal care	129,835	105.3	-0.8	(i) -0.1	-0.1	+0.7
Services related to transport	64,525	106.1	-0.3	-0.8	-0.2	-0.7
Services - miscellaneous	124,782	105.4	+0.1	0.0	+1.2	+1.1
Services	419,462	104.6	-0.3	-0.1	+0.4	+0.6
ALL ITEMS	1,000,000	104.1	0.0	-0.2	+1.3	+1.1
All items excluding energy and unprocessed food (Core inflation)	837,857	103.5	-0.1	-0.1	+0.3	+0.3
All items excluding energy, food, alcohol and tobacco	686,982	103.2	-0.2	-0.1	+0.4	+0.5
All items excluding energy	916,520	104.0	-0.1	0.0	+0.2	+0.3
Grocery and unprocessed food	231,976	105.5	+0.4	+0.5	-0.8	-0.7

(i) Index calculated by imputing elementary data (not available or not usable) representing 50% and more of the weight of the aggregate.

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

January 2016 – May 2021, month on same month a year ago percentage changes (index, 2015=100)

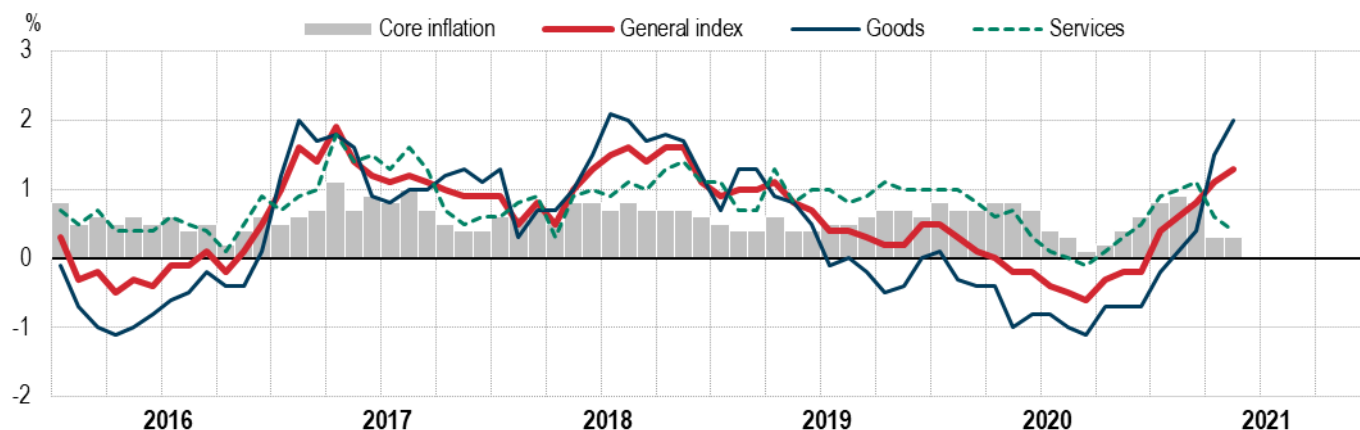


TABLE 4. ITALIAN HARMONIZED CONSUMER PRICE INDEX (HICP), BY ECOICOP DIVISION

May 2021, weights, indices, month on previous month and month on same month a year ago percentage changes (index, 2015=100)

DIVISIONS	Weights	Indices	Month on previous month		Month on same month a year ago	
			May-21	May-20	May-21	Apr-21
			Apr-21	Apr-20	May-20	Apr-20
Food and non-alcoholic beverages	205,912	106.8	+0.5	+0.6	-0.7	-0.6
Alcoholic beverages, tobacco	38,497	110.1	+0.1	+0.3	-0.2	0.0
Clothing and footwear	74,901	110.9	-0.4	-0.3	-0.3	-0.2
Housing, water, electricity, gas and other fuels	119,319	104.6	+0.3	-0.5	+5.9	+5.0
Furnishings, household equipment and routine household maintenance	82,531	102.0	+0.4	0.0	+0.5	+0.1
Health	46,813	103.3	+0.1	0.0	-0.2	-0.3
Transport	135,505	106.7	+0.2	-1.6	+4.8	+2.9
Communication	29,718	81.2	-0.5	-1.2	-2.8	-3.4
Recreation and culture	59,715	101.5	-1.4	-0.8	+0.8	+1.4
Education	11,475	81.8	0.0	(i) -0.1	-3.5	-3.7
Restaurants and hotels	88,378	106.8	-0.6	(i) +0.3	0.0	+0.8
Miscellaneous goods and services	107,236	108.2	0.0	0.0	+1.1	+1.1
ALL ITEMS	1,000,000	105.1	0.0	-0.3	+1.3	+1.0

(i) Index calculated by imputing elementary data (not available or not usable) representing 50% and more of the weight of the aggregate.

TABLE 5. ITALIAN HARMONIZED CONSUMER PRICE INDEX (HICP) BY SPECIAL AGGREGATES

May 2021, 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	
			May-21	May-20	May-21	Apr-21
			Apr-21	Apr-20	May-20	Apr-20
Food, alcohol and tobacco:	244,409	107.4	+0.5	+0.5	-0.5	-0.5
Processed food (including alcohol and tobacco)	169,748	104.9	+0.2	+0.2	-0.6	-0.6
Unprocessed food	74,661	112.2	+1.2	+1.3	-0.5	-0.4
Energy	87,728	104.9	+0.8	-3.1	+14.1	+9.8
Non-energy industrial goods	281,845	104.2	-0.1	-0.2	+0.2	+0.1
Services	386,018	104.6	-0.3	-0.2	+0.2	+0.3
ALL ITEMS	1,000,000	105.1	0.0	-0.3	+1.3	+1.0
All items excluding energy and unprocessed food (Core inflation)	837,611	104.5	-0.2	-0.1	+0.1	+0.2
All items excluding energy, food, alcohol and tobacco	667,863	104.3	-0.3	-0.1	+0.1	+0.3
All items excluding energy	912,272	105.1	0.0	0.0	+0.1	+0.1

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 indicators¹:

- ▶ **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 Statistics - 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 Price 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 2021, the weight of the products exclusively collected through the local survey is equal to 56.2% and that of products collected through the central survey is 22.8%. 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 12.8% 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. Finally, an administrative source is used: the database of fuel prices of Ministry of Economic Development whose weight is equal to 3.7%.

In 2021, 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 2021 survey, prices are collected in about 43,000 statistical units (including outlets, enterprises and institutions) and rents are collected for about 8,000 dwellings. 390,000 price quotes are sent by Municipal Offices of Statistics to Istat each month (384,000 in 2020). Following the annual update of the municipal survey plans, 6.7% of the current price quotes are new (9.7% in 2020): of these, 3.0% are price quotes of new products, while the remaining 3.7% refers to products already in 2020 basket.

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.

In 2021, prices/quotes collected each month directly by Istat are more than 100,000, thereof: almost 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 82 sub-indices (“aggregate of products”) belonging to six ECOICOP Divisions (01, 02, 05, 06, 09, 12).

In agreement with retail trade chains (RTCs) and with the fruitful collaboration of the Association of Modern Distribution and Nielsen, Istat receives scanner data for 4,003 outlets, including 472 hypermarkets, 1,452 supermarkets, 560 discounts, 1,023 outlets with surface between 100 and 400 s.m. and 496 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 18 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 ECR² 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.

Concerning automotive fuels, the use of the data base supplied by the the Ministry of Economic Development (firstly introduced in 2017) has improved the territorial coverage of the index which at present includes all 107 Italian provinces; in 2021 almost 80,000 price quotes are monthly used to estimate inflation and they come from about 14,200 fuel stations on the territory, that is 67.1% of the ones present in Ministry database.

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 2020.

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

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 products of ECOICOP classification.

measure the expenditure shares with reference to the value of the computation base period of indices (December 2020), household final consumption data, are price-updated using the price changes measured between the year 2020 (on average) and December 2020.

Table 1 shows the 2021 weighting structures by expenditure division of NIC and HICP.

TABLE 1. WEIGHTS USED TO CALCULATE CONSUMER PRICE INDICES BY EXPENDITURE DIVISION.

Year 2021, percentage values

EXPENDITURE DIVISIONS	NIC	HICP
Food and non-alcoholic beverages	19.3405	20.5912
Alcoholic beverages, tobacco	3.6133	3.8497
Clothing and footwear	6.5355	7.4901
Housing, water, electricity, gas and other fuels	11.1952	11.9319
Furnishings, household equipment and routine household maintenance	7.7224	8.2531
Health	9.5512	4.6813
Transport	12.7341	13.5505
Communication	2.7883	2.9718
Recreation and culture	7.1028	5.9715
Education	1.0766	1.1475
Restaurants and hotels	8.294	8.8378
Miscellaneous goods and services	10.0461	10.7236
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 Eurostat³. 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 HICP⁴. The same method is also used for the NIC⁵. 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*.

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.

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 +0.2 percentage points in January 2021. 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) (-0.6 in November 2020), and consequently Food, including alcohol and tobacco (-0.3 in November 2020), Energy (+0.9 percentage points in October 2020) and Non energy industrial goods (+0.5 in January 2021).

The highest frequency of revisions is observed for Processed food, including alcohol and tobacco (12 months out of

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.

13, 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 Non energy industrial goods (9 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) and for Services (6 months out of 13); 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.

TABLE 2. FLASH ESTIMATES AND HICP ANNUAL RATES FOR THE ALL-ITEMS AND MAIN SPECIAL AGGREGATES

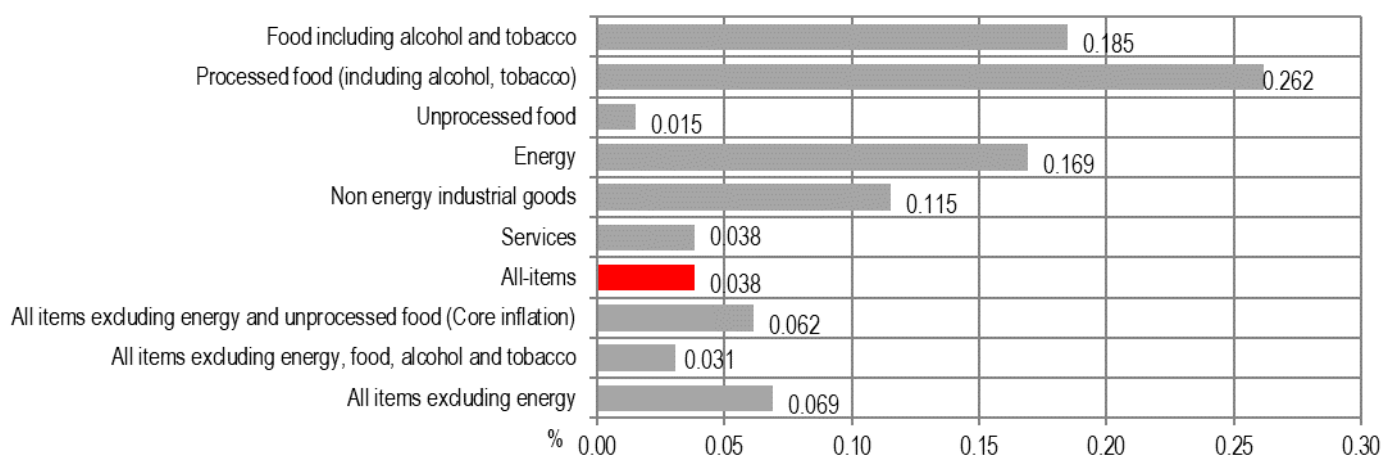
April 2020 – April 2021, percentage values (base 2015=100)

Special aggregates		Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21
Food including alcohol and tobacco:	Flash	2.9	2.7	2.6	1.7	1.4	1.4	1.6	1.8	1.2	0.9	0.6	0.1	-0.3
	HICP	2.9	2.6	2.4	1.4	1.1	1.3	1.5	1.5	0.9	0.7	0.5	-0.1	-0.5
Processed food (including alcohol, tobacco)	Flash	2.0	2.0	1.6	1.3	1.1	0.8	0.7	1.1	1.0	0.8	0.6	-0.3	-0.2
	HICP	2.0	1.9	1.4	0.9	0.8	0.6	0.5	0.5	0.6	0.6	0.4	-0.5	-0.6
Unprocessed food	Flash	4.9	4.1	4.7	2.7	2.0	2.9	3.9	3.5	1.9	1.2	0.6	1.0	-0.4
	HICP	4.9	4.2	4.7	2.7	2.0	2.9	3.9	3.5	1.9	1.1	0.6	1.0	-0.4
Energy	Flash	-9.9	-13.1	-12.5	-10.1	-10.3	-10.1	-9.8	-8.8	-8.0	-5.6	-3.2	0.3	9.5
	HICP	-9.9	-13.1	-12.5	-10.6	-10.3	-10.1	-8.9	-8.8	-8.0	-5.1	-3.2	0.3	9.8
Non energy industrial goods	Flash	0.5	0.6	0.6	5.8	1.2	-0.9	0.0	0.2	0.3	2.2	3.0	0.3	0.0
	HICP	0.7	0.5	0.6	5.7	1.2	-0.9	0.1	0.3	0.3	2.7	2.8	0.2	0.1
Services	Flash	0.5	0.7	0.4	0.1	-0.1	-0.2	-0.1	0.1	0.4	0.6	1.0	1.0	0.3
	HICP	0.6	0.7	0.4	0.0	-0.1	-0.3	-0.1	0.2	0.4	0.7	1.0	1.0	0.3
All-items	Flash	0.1	-0.2	-0.4	0.9	-0.5	-0.9	-0.6	-0.3	-0.3	0.5	1.0	0.6	1.0
	HICP	0.1	-0.3	-0.4	0.8	-0.5	-1.0	-0.6	-0.3	-0.3	0.7	1.0	0.6	1.0
All items excluding energy and unprocessed food (Core inflation)	Flash	0.8	0.9	0.7	2.0	0.5	-0.3	0.0	0.3	0.5	1.1	1.4	0.6	0.2
	HICP	0.8	0.8	0.6	1.9	0.4	-0.4	0.0	0.3	0.4	1.2	1.4	0.5	0.2
All items excluding energy, food, alcohol and tobacco	Flash	0.6	0.6	0.5	2.1	0.3	-0.4	-0.1	0.2	0.4	1.1	1.5	0.7	0.3
	HICP	0.6	0.6	0.5	2.1	0.3	-0.5	-0.1	0.3	0.4	1.3	1.5	0.7	0.3
All items excluding energy	Flash	1.1	1.2	0.9	2.0	0.6	0.0	0.4	0.5	0.6	1.2	1.4	0.6	0.2
	HICP	1.1	1.1	0.9	1.9	0.5	-0.1	0.3	0.5	0.5	1.3	1.4	0.5	0.1

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 Processed food (including alcohol tobacco) (0.262 percentage points), Food including alcohol and tobacco (0.185 percentage points) and Energy (0.169 percentage) recorded the highest MADs.

FIGURE 1. MEAN ABSOLUTE DEVIATION BETWEEN FLASH ESTIMATES AND HICP ANNUAL RATES.

April 2020 – April 2021, 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 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.

These guidelines set out three main principles to follow:

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. minimization of the number of price imputations.

In compliance with the guidelines, imputation procedures have been used to estimate both the prices of existing products that could not be collected, and the prices of products that are not available in the market (as in the case of flight or other touristic services) or that are available in negligible quantities.

The choice of the appropriate rate of change for the imputation of each missing observation is made case by case, taking into account different aspects, such as the incidence of missing prices in the stratum, its position in the classification structure, the price volatility of the products also in terms of seasonal profile.

Consequently, the following threefold approach has been adopted:

- 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 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.

Regarding the expenditure aggregates most affected by the missing price issues, the adopted solutions are the following:

- a. for clothing and footwear, for fresh food, for which prices are collected monthly and for fresh food, for which prices are normally collected twice a month and both prices are not available, missing prices are estimated using the monthly rate of change of the prices of the product offers in the provinces where the price collection has been carried out. Specifically in the cases of clothing and footwear and of for fresh food, for which prices are normally collected twice a month, the usual rules for the imputation of seasonal products have been applied;
- b. for food, for which prices are normally collected one a month, for fresh fish, for pharmaceutical products dispensed without medical prescription and for other medical products, the imputation of missing prices is based on the monthly rate of change of the product offers collected in the provinces where the price collection took place;
- c. for furnishing and other services for the house, considering the stickiness of their prices, missing observations are imputed on the basis of the last price information available (carry forward method);

- d. the carry forward method is also used for the imputation of the prices of restaurants, cultural and recreational services.

Specific solutions following the European guidelines have been implemented for tourism services, accommodation services and for transport services, that show a clear seasonal profile and for which prices are mostly collected in advance.

In May 2021⁶, following the measures introduced by the government already at the end of April and which produced the first reopenings and the possibility of resuming mobility, not dictated by reasons of strict necessity, across different geographical areas, it was reduced the group of products, in particular services, for which it was not possible to use, for the calculation of inflation, the prices recorded in advance. In this group, amusement parks, national parks, zoological and botanical gardens on the one hand remain, on the other hand the ski lifts. For the first, since these products have a limited temporal variability, the prices of the previous month were repeated (the carry forward method); for ski lifts, taking into account Eurostat indications regarding the imputation for products with a seasonal profile, the annual rate of change of the general index (calculated without these groups of product) was used, by applying it to May 2020 prices/indices. For the other services (accommodation services, national and international package holidays, pensions and the like, holiday villages, campsites, youth hostels and the like), the prices collected in advance have returned to be used in line with the survey methodology.

All the indices compiled by using a share of imputations equal to at least 50% in terms of elementary prices and/or in terms of weight are flagged by “i” (imputed data) on the tables of this press release, on I.Stat and other publications (on “Rivaluta”, when the definitive data are released, these indices are not available).

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).

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.

⁶ 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>).

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

Paola Pompei

tel. +39 06 4673 2448

paola.pompei@istat.it

Federico Polidoro

tel. +39 06 4673 2307

federico.polidoro@istat.it