March 2023
CONSUMER PRICES
Final data

- In March 2023 the rate of change of the Italian consumer price index for the whole nation (NIC) was -0.4% on monthly basis and +7.6% on annual basis (from +9.1% in February); the flash estimate was +7.7%.

- The slowdown in inflation was mainly due to the deceleration of the prices of Non-regulated energy goods (from +40.8% to +18.9%) and to the accentuated decline in those of Regulated energy (from -16.4% to -20.3%). On the contrary, an upward contribution to the inflation rate came from the prices of Unprocessed food (from +8.7% to +9.1%), Services relating to housing (from +3.3% to +3.5%), Tobacco (from +1.8% to +2.5%) and those of Services related to recreation including repair and personal care (from +6.1% to +6.3%).

- The core inflation (All-items excluding energy and unprocessed food) was +6.3% and the annual rate of change of the All-items index excluding energy was +6.4%, both stable compared to the previous month.

- The annual rate of change of prices of Goods was +9.7% (from +12.4% in February) and that of prices of Services was +4.5% (from +4.4% in the previous month). As a consequence, the negative inflationary gap between Services and Goods decreases (from -8.0 percentage points in February to -5.2).

- Prices of Grocery and unprocessed food increased by +0.7% on monthly basis and by +12.6% on annual basis (down from +12.7% in the previous month).

- The month on month decrease of NIC was due to the prices of Non-regulated energy products (-9.6%) and of Regulated energy products (-4.6%); at the opposite an upward effect comes from the prices of Unprocesses food (+1.0%), Services related to transport (+0.9%), Processed food including alcohol and Tobacco (+0.7% both), Semi-durable goods (+0.5%), Non-durable goods and Services related to recreation, including repair and personal care and Services related to housing (all three +0.3%).

- In March 2023, the Italian harmonised index of consumer prices (HICP) increased by 0.8% on monthly basis, mainly due to the end of the winter sales of Clothing and footwear (not considered by NIC); as a result, the annual rate of change of the Italian HICP was 8.1% (from +9.8% in February); the flash estimate was +8.2%.

- In the first quarter of 2023, inflation measured by HICP had a wider impact on the sub-population with the lowest level of equivalent expenditure than on households with highest amount of expenditure (+12.5 and +8.2% respectively).

CHART 1. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC)
January 2018 – March 2023, month on previous month and month on same month a year ago percentage changes (index, 2015=100)
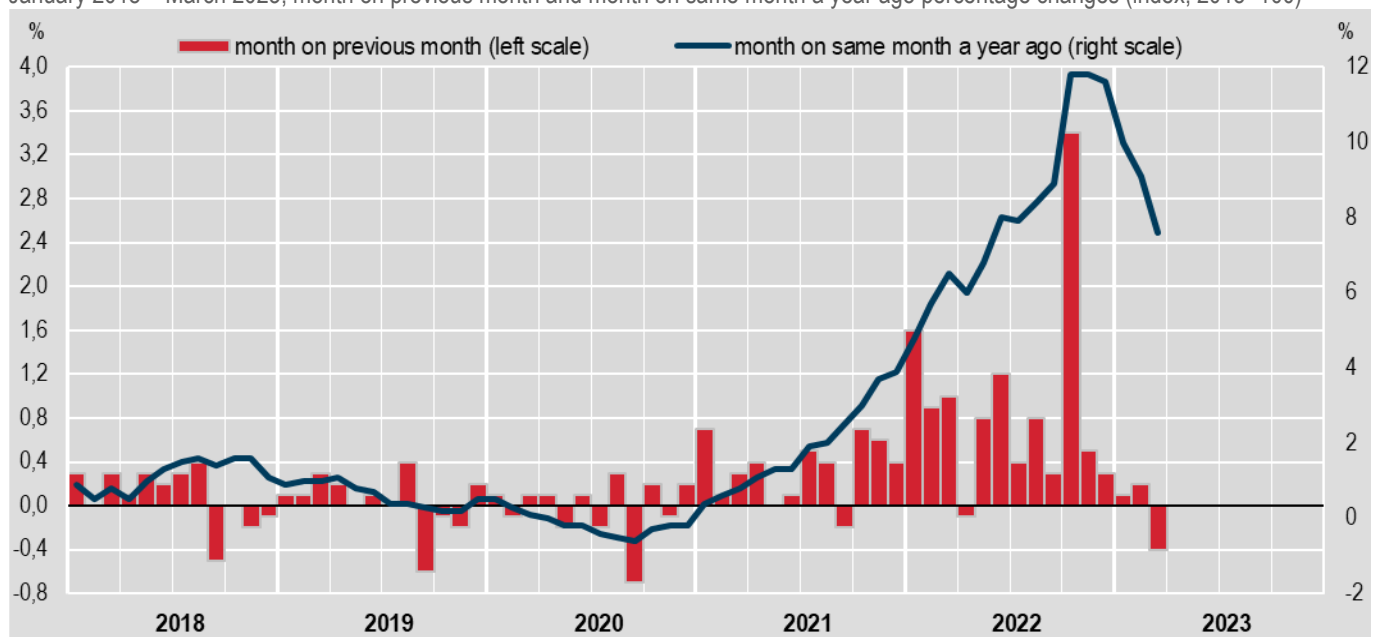
TABLE 1. ITALIAN CONSUMER PRICE INDICES
March 2023, month on previous month and month on same month a year ago percentage changes (index, 2015=100)

	INDICES	Month on previous month	Month on same month a year ago
	March 2023	Mar-23 / Feb-23	Mar-23 / Mar-22
Italian consumer price index for the whole nation (NIC)	118.8	-0.4	+7.6
Italian harmonized index of consumer prices (HICP)	120.3	+0.8	+8.1

TABLE 2. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC) BY ECOICOP DIVISION
March 2023, 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	
			Mar-23 / Feb-23	Mar-22 / Feb-22	Mar-23 / Mar-22	Feb-23 / Feb-22
Food and non-alcoholic beverages	171,025	126.3	+0.9	+0.9	+13.2	+13.2
Alcoholic beverages, tobacco	29,875	115.2	+0.5	+0.1	+4.3	+3.9
Clothing and footwear	64,371	106.9	+0.6	+0.6	+3.2	+3.2
Housing, water, electricity, gas and other fuels	121,287	152.3	-6.7	+0.9	+15.1	+24.5
Furnishings, household equipment and routine household maintenance	76,987	113.3	+0.1	+0.5	+7.8	+8.2
Health	83,284	104.9	+0.2	+0.1	+1.6	+1.6
Transport	140,656	121.6	0.0	+3.9	+2.6	+6.6
Communication	23,406	79.8	-1.1	-0.5	+0.9	+1.5
Recreation and culture	78,807	106.8	+0.2	-0.4	+3.9	+3.3
Education	9,135	82.1	0.0	0.0	+0.9	+0.9
Restaurants and hotels	108,510	118.7	+0.6	+0.6	+8.0	+8.1
Miscellaneous goods and services	92,657	113.3	+0.2	+0.4	+3.8	+4.0
ALL ITEMS	**1,000,000**	**118.8**	**-0.4**	**+1.0**	**+7.6**	**+9.1**

CHART 2. ITALIAN NATIONAL CONSUMER PRICE INDEX (NIC) BY COICOP DIVISION
March 2023, month on same month a year ago percentage changes (index, 2015=100)
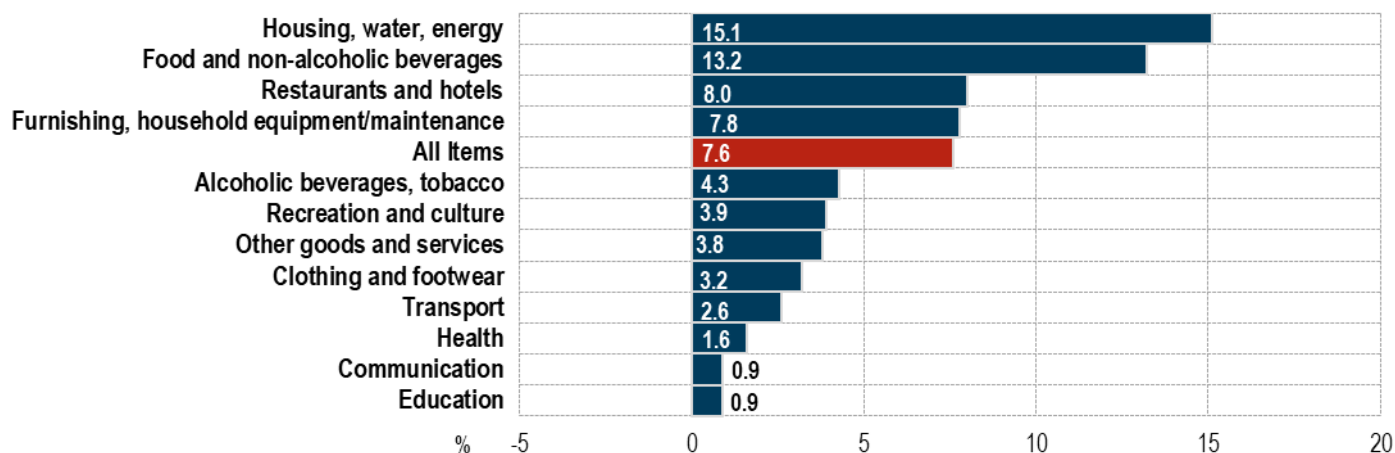
TABLE 3. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC) BY TYPE OF PRODUCTS

March 2023, 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	
			Mar-23 Feb-23	Mar-22 Feb-22	Mar-23 Mar-22	Feb-23 Feb-22
Food including alcohol:	181,442	125.4	+0.9	+0.9	+12.9	+12.9
Processed food including alcohol	114,951	122.9	+0.7	+0.9	+15.3	+15.5
Unprocessed food	66,491	128.9	+1.0	+0.6	+9.1	+8.7
Energy:	100,949	170.8	-8.9	+5.5	+10.8	+28.2
Regulated energy products	17,949	152.0	-4.6	0.0	-20.3	-16.4
Non-regulated energy products	83,000	169.4	-9.6	+7.1	+18.9	+40.8
Tobacco	19,458	116.6	+0.7	0.0	+2.5	+1.8
Non energy industrial goods:	274,337	107.9	+0.3	+0.4	+5.4	+5.5
Durable goods	104,401	108.0	+0.1	+0.4	+6.3	+6.6
Non-durable goods	69,611	109.4	+0.3	+0.4	+6.8	+7.0
Semi-durable goods	100,325	106.3	+0.5	+0.5	+3.1	+3.1
Goods	**576,186**	**124.1**	**-1.0**	**+1.4**	**+9.7**	**+12.4**
Services related to housing	73,873	108.4	+0.3	+0.1	+3.5	+3.3
Services related to communication	15,699	91.9	0.0	0.0	+0.5	+0.5
Services related to recreation, including repair and personal care	155,995	115.0	+0.3	+0.2	+6.3	+6.1
Services related to transport	65,828	115.7	+0.9	+0.9	+6.3	+6.4
Services - miscellaneous	112,419	109.1	+0.2	+0.1	+2.5	+2.4
Services	**423,814**	**111.2**	**+0.4**	**+0.3**	**+4.5**	**+4.4**
ALL ITEMS	**1,000,000**	**118.8**	**-0.4**	**+1.0**	**+7.6**	**+9.1**
All items excluding energy and unprocessed food (Core inflation)	832,560	112.0	+0.4	+0.4	+6.3	+6.3
All items excluding energy, food, alcohol and tobacco	698,151	110.0	+0.3	+0.4	+4.8	+4.9
All items excluding energy	899,051	113.2	+0.4	+0.5	+6.4	+6.4
Grocery and unprocessed food	207,578	123.5	+0.7	+0.8	+12.6	+12.7

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

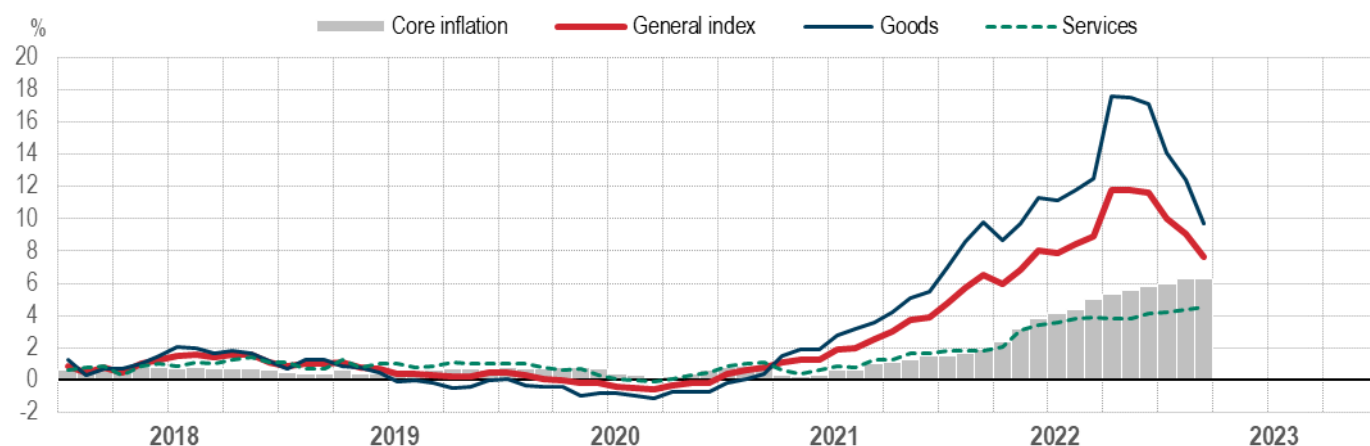January 2018 - March 2023, month on same month a year ago percentage changes (index, 2015=100)

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

March 2023, 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	
			Mar-23 Feb-23	Mar-22 Feb-22	Mar-23 Mar-22	Feb-23 Feb-22
Food and non-alcoholic beverages	181,443	126.6	+0.8	+0.9	+13.2	+13.4
Alcoholic beverages, tobacco	31,698	115.0	+0.5	+0.1	+4.3	+3.8
Clothing and footwear	74,403	111.5	+20.8	+24.7	+4.0	+7.3
Housing, water, electricity, gas and other fuels	128,704	152.3	-6.7	+1.0	+15.0	+24.5
Furnishings, household equipment and routine household maintenance	81,963	112.5	+0.3	+0.9	+7.4	+8.1
Health	40,100	106.5	+0.3	+0.1	+2.6	+2.4
Transport	148,974	121.7	+0.1	+3.9	+2.7	+6.6
Communication	24,851	79.9	-1.0	-0.4	+0.9	+1.5
Recreation and culture	64,516	109.0	+0.3	-0.6	+5.1	+4.2
Education	9,691	82.1	+0.1	0.0	+0.9	+0.7
Restaurants and hotels	115,117	118.7	+0.6	+0.6	+8.0	+8.1
Miscellaneous goods and services	98,540	113.6	+0.6	+0.5	+4.1	+4.0
ALL ITEMS	**1,000,000**	**120.3**	**+0.8**	**+2.4**	**+8.1**	**+9.8**
All items at constant tax rates	1,000,000	120.5	+0.8	+2.8	+7.8	+9.9

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

March 2023, 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	
			Mar-23 Feb-23	Mar-22 Feb-22	Mar-23 Mar-22	Feb-23 Feb-22
Food, alcohol and tobacco:	213,141	124.9	+0.8	+0.7	+12.0	+11.9
Processed food (including alcohol and tobacco)	150,656	122.2	+0.7	+0.8	+13.4	+13.6
Unprocessed food	62,485	130.0	+1.0	+0.6	+8.8	+8.3
Energy:	106,459	171.4	-8.9	+5.4	+10.7	+28.2
Electricity, gas, solid fuels and heat energy	63,842	204.5	-15.3	+1.6	+17.5	+40.9
Liquid fuels and fuels and lubricants for personal transport equipment	42,617	127.9	-1.7	+10.4	-6.4	+5.1
Non-energy industrial goods:	290,408	110.8	+4.8	+5.7	+5.9	+6.8
Durable goods	109,028	108.1	+0.2	+0.5	+6.6	+6.9
Non-durable goods	65,830	114.8	+0.3	+0.4	+8.6	+8.6
Semi-durable goods	115,550	109.9	+12.9	+15.5	+3.9	+6.2
Goods	**610,008**	**125.7**	**+1.0**	**+3.7**	**+10.0**	**+12.9**
Services related to housing	78,443	107.6	+0.3	+0.2	+3.0	+2.9
Services related to communication	16,673	92.0	0.0	0.0	+0.5	+0.5
Services related to recreation, including repairs and personal care	146,543	117.0	+0.3	+0.2	+7.0	+6.9
Services related to transport	69,587	115.7	+0.9	+0.9	+6.4	+6.5
Services - miscellaneous	78,746	109.0	+0.3	+0.1	+2.9	+2.7
Services	**389,992**	**111.7**	**+0.4**	**+0.4**	**+4.8**	**+4.8**
ALL ITEMS	**1,000,000**	**120.3**	**+0.8**	**+2.4**	**+8.1**	**+9.8**
All items excluding energy and unprocessed food (Core inflation)	831,056	113.3	+1.9	+2.1	+6.8	+7.0
All items excluding energy, food, alcohol and tobacco	680,400	111.3	+2.3	+2.5	+5.3	+5.5
All items excluding energy	893,541	114.5	+1.9	+2.0	+6.9	+7.0

TABLE 6. ITALIAN HARMONIZED CONSUMER PRICE INDEX (HICP) BY POPULATION SUBGROUPS
2022 – Q1 2023, month on same month a year ago percent changes (index, 2015=100)

POPULATION SUBGROUPS	Year on year	Quarter on same quarter a year ago			
	2022 **2021**	**Q2 2022** **Q2 2021**	**Q3 2022** **Q3 2021**	**Q4 2022** **Q4 2021**	**Q1 2023** **Q1 2022**
1st group	+12.1	+9.8	+11.6	+18.4	+12.5
2nd group	+10.6	+8.8	+10.4	+15.5	+11.1
3rd group	+9.4	+8.0	+9.5	+13.4	+9.9
4th group	+8.5	+7.2	+8.7	+11.9	+9.2
5th group	+7.2	+6.1	+7.6	+9.9	+8.2
HICP	**+8.7**	**+7.4**	**+8.9**	**+12.5**	**+9.5**

TABLE 7. REVISIONS OF CONSUMER PRICE INDICES
March 2023, indices, month on previous month and month on same month a year ago percentage changes (index, 2015=100)

	FLASH ESTIMATES			FINAL DATA		
	indices	rates of change%		indices	rates of change %	
	March 2023	<u>Mar-23</u> Feb-23	<u>Mar-23</u> Mar-22	March 2023	<u>Mar-23</u> Feb-23	<u>Mar-23</u> Mar-22
Italian consumer price index for the whole nation (NIC)	118.9	-0.3	+7.7	118.8	-0.4	+7.6
Italian harmonized index of consumer prices (HICP)	120.4	+0.8	+8.2	120.3	+0.8	+8.1

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 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 2023, the weight of the products exclusively collected through the local survey is equal to 51.3% and that of products collected through the central survey is 24.8%. In addition to these two ways, the acquisition of elementary prices (for grocery products) is carried out through scanner data with regard to the large scale retail trade distribution channels that are hypermarkets, supermarkets, discounts, small sales areas and specialist drug (for 13.6% in terms of weight), where traditional data collection is no longer carried out. Finally, administrative sources are used: the database of fuel prices of Ministry of Economic Development whose weight is equal to 5.8%; the data provided by the Real Estate Market Observatory of the Tax Office for the survey of the prices of real rentals for private dwellings which weighs 2.6% and the Excise, Customs and Monopolies Agency for the survey on tobacco products, which accounts for 1.9% of the basket.

In 2023, the geographical basis of the survey is made up of 79 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, 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 91 municipalities (79 for the full basket and 12 for a subset of products) taking part in the 2023 survey, prices are collected in about 44,000 statistical units (including outlets, enterprises and institutions) and rents are collected for about 2,700 dwellings for social housing. 398,000 price quotes are sent by Municipal Offices of Statistics to Istat each month (392,000 in 2022). Following the annual update of the municipal survey plans, 10.2% of the current price quotes are new (4.9% in 2022): of these, 4.2% are price quotes of new products, while the remaining 6.0% refers to products already in 2022 basket.

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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.

Over 189,000 price quotations are collected each month centrally by Istat, to which are added, since 2023, 180 million data collected through scraping techniques for passenger transport by air. As regards the first group approximately 192 thousand are obtained through web, also with the use of procedures of web scraping or acquiring information from external subjects; 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; more than 700 collected using 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 103 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 4,283 outlets, including 483 hypermarkets, 1,577 supermarkets, 588 discounts, 1,066 outlets with surface between 100 and 400 s.m. and 569 specialist drug. These outlets belong to the main 19 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 20 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 12 million references thereof about 33 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 2023, around 167,500 price quotes are monthly used to estimate inflation and they come from almost 16,500 fuel stations on the territory that is 74.0% of the ones present in Ministry database. The sample of fuel stations covers the geographical areas of country. Specifically: almost 4,000 are located in the North-West; almost 3,500 in the North-East, around 3,600 in the Centre; more than 3,700 in the South and around 1,750 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 Tax Office. The production of the indices benefits from the collaboration of the Central Directorate for Real Estate Market Observatory and Estimating Services (OMISE) of the Tax Office. 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. In particular, dwellings have been stratified according to the position in terms of OMI zones distinguishing between urban macro area if existing or, alternatively, to groups of zones; the type of the contract (free or agreed fee contract) and the duration (long or short term contract); the surface classes. After data cleaning and integration more than one and a half million rents are available for monthly estimation; part of them refers to contracts to be updated according to the consumer prices for blue and white-collar worker households index (FOI).

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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 2022.

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 2022), household final consumption data, are price-updated using the price changes measured between the average of year 2022 and December 2022.

Table 1 shows the 2023 final weighting structures by expenditure division of NIC and HICP used to calculate the estimates of inflation of January 2023.

TABLE 1. WEIGHTS USED TO CALCULATE CONSUMER PRICE INDICES BY EXPENDITURE DIVISION.
Year 2023, percentage values

EXPENDITURE DIVISIONS	NIC	HICP
Food and non-alcoholic beverages	17,1025	18,1443
Alcoholic beverages, tobacco	2,9875	3,1698
Clothing and footwear	6,4371	7,4403
Housing, water, electricity, gas and other fuels	12,1287	12,8704
Furnishings, household equipment and routine household maintenance	7,6987	8,1963
Health	8,3284	4,0100
Transport	14,0656	14,8974
Communication	2,3406	2,4851
Recreation and culture	7,8807	6,4516
Education	0,9135	0,9691
Restaurants and hotels	10,851	11,5117
Miscellaneous goods and services	9,2657	9,854
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*.

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.

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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.

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 imputated 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) 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.

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;

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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.

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 imputed) 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 and in February 2023), Unprocessed food (+0.5 in February 2023), Energy (-2.0 in March 2022, -2.8 in April 2022, -2.2 in October 2022 and -0.5 in January 2023) and Non energy industrial goods (+0.3 in August 2022 and -0.3 in January 2023).

TABLE 2. FLASH ESTIMATES AND HICP ANNUAL RATES FOR THE ALL-ITEMS AND MAIN SPECIAL AGGREGATES
March 2022 – March 2023, percentage values (base 2015=100)

Special aggregates		Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
Food including alcohol and tobacco:	Flash	5.1	5.8	6.5	8.0	8.8	9.3	10.4	11.9	12.0	11.6	11.2	12.1	12.0
	HICP	5.0	5.5	6.4	7.9	8.8	9.2	10.2	11.8	11.9	11.6	11.0	11.9	12.0
Processed food (including alcohol. tobacco)	Flash	3.4	4.6	5.7	7.0	8.1	8.9	10.0	11.3	12.4	12.8	13.1	14.0	13.5
	HICP	3.4	4.2	5.6	6.9	8.1	8.8	9.8	11.3	12.3	12.7	12.9	13.6	13.4
Unprocessed food	Flash	8.8	8.7	8.6	10.3	10.1	10.1	11.4	13.1	11.3	9.1	7.1	7.8	9.0
	HICP	8.8	8.7	8.6	10.3	10.1	10.1	11.4	13.1	11.4	9.0	7.0	8.3	8.8
Energy	Flash	53.5	42.8	42.6	49.1	43.3	45.4	45.0	73.9	67.8	65.1	43.3	28.2	10.7
	HICP	51.5	40.0	42.9	49.1	43.4	45.4	45.0	71.7	68.1	65.1	42.8	28.2	10.7
Non energy industrial goods	Flash	1.8	2.1	2.6	3.0	2.5	3.8	4.4	4.8	5.3	5.3	6.9	6.9	6.0
	HICP	1.8	2.1	2.6	2.9	2.5	4.1	4.4	4.9	5.3	5.5	6.6	6.8	5.9
Services	Flash	1.9	2.3	3.3	3.7	4.0	4.0	4.4	4.2	4.3	4.5	4.4	4.8	4.8
	HICP	2.0	2.4	3.3	3.7	4.0	4.0	4.4	4.3	4.3	4.5	4.4	4.8	4.8
All-items	Flash	**7.0**	**6.6**	**7.3**	**8.5**	**8.4**	**9.0**	**9.5**	**12.8**	**12.5**	**12.3**	**10.9**	**9.9**	**8.2**
	HICP	**6.8**	**6.3**	**7.3**	**8.5**	**8.4**	**9.1**	**9.4**	**12.6**	**12.6**	**12.3**	**10.7**	**9.8**	**8.1**
All items excluding energy and unprocessed food (Core inflation)	Flash	2.1	2.7	3.4	4.1	4.3	4.8	5.4	5.7	6.2	6.4	6.8	7.1	6.9
	HICP	2.1	2.6	3.4	4.0	4.3	4.9	5.3	5.7	6.1	6.5	6.6	7.0	6.8
All items excluding energy. food. alcohol and tobacco	Flash	1.8	2.2	2.9	3.4	3.4	3.9	4.4	4.5	4.7	4.8	5.4	5.6	5.3
	HICP	1.8	2.2	3.0	3.4	3.4	4.1	4.4	4.6	4.7	4.8	5.2	5.5	5.3
All items excluding energy	Flash	2.7	3.1	3.9	4.6	4.8	5.2	5.9	6.4	6.5	6.5	6.9	7.1	7.0
	HICP	2.7	3.1	3.9	4.6	4.7	5.4	5.8	6.4	6.5	6.6	6.7	7.0	6.9

The highest frequency of revisions is observed for Processed food, including alcohol and tobacco (10 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 (7 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.

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 (0.631 percentage points), Processed food (including alcohol, tobacco) (0.138 percentage points), and Food including alcohol and tobacco (0.115 percentage points), and Non energy industrial goods (0.092 percentage points) recorded the highest MADs.

FIGURE 1. MEAN ABSOLUTE DEVIATION BETWEEN FLASH ESTIMATES AND HICP ANNUAL RATES.
March 2022 – March 2023, percentage points
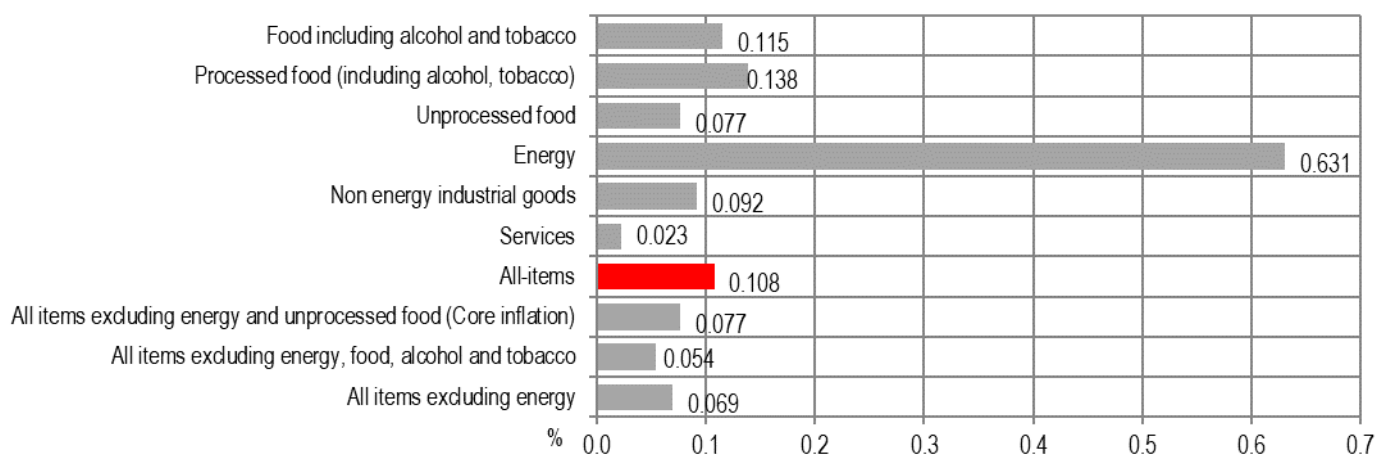
Inflation measures for population subgroups

The consumer price indices by population subgroups are "satellite" indices of the Harmonized index of consumer price (HICP): they are computed starting from the same basic information used for the HICP (i.e. the same basket of products and the same price elementary data) by modifying the system of weights used for their calculation.

Five subgroups have been identified sorting households by the amount of equivalent expenditure[9] (that is calculated taking into account the size of each household) and then dividing them in 5 subgroups of the same size so that in the first group there are the households with the lowest level of expenditure and in the last group those with the highest level of expenditure. For each of the previous groups, different weighting schemes were estimated.

The indices of five subgroups share the set of basic information (basket of products and price elementary data) and the methodology of Italian HICP, but they are different from one another for the system of weights used for their calculation. Specifically, the estimates of the system of weights for the five subgroups are based on the data derived from Household Budget Survey (HBS), carried out in 2022 (as it was done in the case of weights estimation for the HICP referred to the population as a whole).

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[9] Households' expenditure was made equivalent by using Carbonaro scale which enables to take into account the effect of economies of scale and to make the expenditure levels of different-size households directly comparable.

For each subgroup, the weights are estimated by modifying the HICP weight at the level of classification corresponding to the aggregate of product[10], on the basis of the share of the expenditure devoted by the target group of households to the purchase of the products in each aggregate of product, with respect to the whole population.

For that purpose, it has been necessary to define a link between the HBS data and the basket of products used for the calculation of the HICP. The link between the HBS elementary expenditure data and HICP aggregates of product was mainly obtained at level of subclass. In other cases it was necessary to make a link at a more aggregated level of expenditure data (as for durable goods, assistance, education) in order to maintain the significance of estimates related to each subgroup.

The all-items consumer price indices by population subgroups, as well as the indices of the special aggregates, were calculated from January 2005, with reference base year 2015=100, consistently with the HICP. The dissemination of these indicators (brought to quarterly frequency in 2022), enlarge the statistical information on the temporal dynamics of consumer prices allowing an evaluation of the effects of inflation on specific subgroups of population, identified according to the total expenditure level of the households.

FIGURE 2. HARMONIZED INDICES OF CONSUMER PRICES. WEIGHTS OF THE SPECIAL AGGREGATES INDICES FOR POPULATION SUBGROUPS (PER MILLION).
Year 2023, percentage values
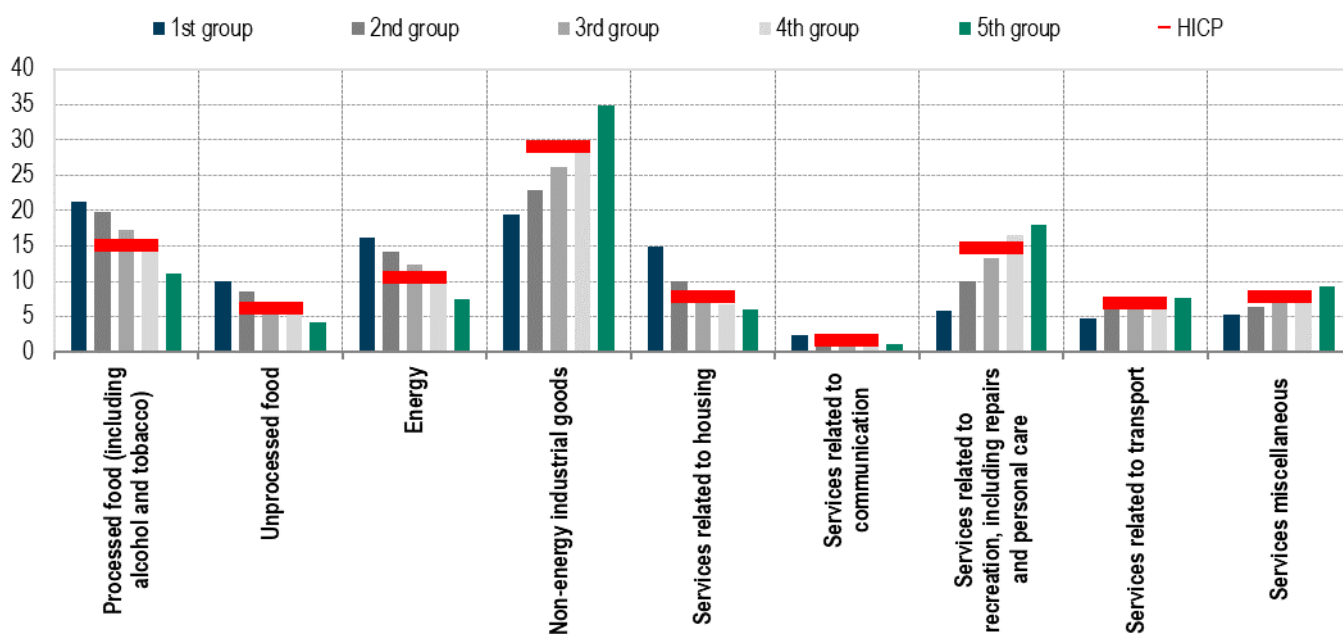
Regarding the weights estimated for the compilation of indices for 2023, figure 2 shows that the share of expenditure for Food (including alcohol and tobacco), Energy, Goods and Services related to housing is inversely correlated with the level of total expenditure. In more details, with reference to the households of the first group of the distribution (i.e. the 20% of those with the lowest equivalent expenditure), the weights of these components are significantly higher than the corresponding weights in the Italian HICP and more than double as compared to the weights estimated for the households of the last group (the 20% of population with the highest equivalent expenditure).

At the opposite, the incidence on the households' expenditure of Non-energy industrial goods, Services related to recreation, culture and personal care, Services related to transport and Services miscellaneous increase together with the increase of the level of total expenditure.

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[10]For the year 2023 in Italian HICP classification scheme, aggregates of products are 427.

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.

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*").

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