13 July 2016

Consumer prices: final data

June 2016

In June 2016 the Italian consumer price index for the whole nation (NIC) increased by 0.1 on monthly basis and declined by 0.4% with respect to June 2015, down from -0.3% in May 2016. The flash estimate was confirmed.

The larger decline on annual basis of the All items index took place within a framework of basic stability of the annual rates of change of the prices of the different types of products. Exceptions are the slowdown of the annual growth of prices of Non energy industrial goods (+0.5%, from +0.7% in May 2016), the reduction of the decline of prices of Non-regulated energy goods (-8.1%, from 10.0% in May 2016) and the speed up of prices of Tobacco (+2.9%, from +2.0% in the previous month).

Excluding energy and unprocessed food, core inflation was +0.5% (down from +0.6 registered in May 2016) and, excluding energy, the inflation was +0.4% (0.1 percentage points lower than that of the previous month).

The increase on monthly basis of All items index was mainly due to the rise of prices of Non-regulated energy products (+2.1%), of Tobacco (+0.6%), and of Services related to recreation, including repair and personal care (+0.4%).

The annual rate of change of prices of Goods was -0.8% (up from -1.0% in May 2016) and the annual rate of change of prices of Services was +0.4% (the same rate observed in the previous month). As a consequence, the inflationary gap between Services and Goods decreased by 0.2 percentage points with respect to May 2016.

Prices of Grocery and unprocessed food increased by 0.2% both on monthly basis and on annual basis (the rate of change was zero in the previous month).

In June 2016 the Italian harmonized index of consumer prices (HICP) increased by 0.2 compared with the previous month and decreased by 0.2% with respect to June 2015 (the flash estimate was -0.3%), up from -0.3% registered in May 2016.

Core inflation measured by Italian HICP was +0.5% (down from +0.6% in May 2016); both the inflation excluding Energy, food, alcohol and tobacco and the inflation excluding Energy were +0.5% (down from +0.6% in the previous month).

In June 2016, the Italian harmonized index of consumer prices at constant tax rates (HICP-CT) rose by 0.2% compared with May 2016 and declined by 0.3% with respect to June 2015 (0.1 lower than HICP). Therefore, the difference between HICP and HICP-CT growth rates – which incorporates the effects of changes in indirect taxes occurred in the last twelve months – was positive and equal to 0.1: it has to be noted that this difference represents the upper limit of the impact of changes in indirect taxes occurred in the last twelve months on HICP, assuming their full and instantaneous pass-through on prices paid by consumers.

In the first half of 2016, Italian HICP exhibited a deflationary tendency for most of the population subgroups defined according to the consumption expenditure level.

Specifically, in the first quarter of 2016, inflation rates varied in a range between -0.7% of the first subgroup (i.e. the 20% of those households with the lowest equivalent expenditure) and 0.2% of the last subgroup (the 20% of population with the highest equivalent expenditure). In the same period, headline inflation, as measured by HICP fell to 0%.

Concerning the last population subgroup, however, a further decline in the second quarter of 2016 pushed the inflation rate to –0.1%, while for the households with the lower level of expenditure quarterly rate of change on annual basis remained stable and equal to -0.7%.

ITALIAN CONSUMER PRICE INDICES. JUNE 2016, (base 2015=100) (a)

	INDICES Jun 2016	Jun-16 / May-16	Jun-16 / Jun-15
Italian consumer price index for the whole nation (NIC)	99.9	0.1	-0.4
Italian harmonized index of consumer prices (HICP)	100.8	0.2	-0.2

(a) The previous reference base year was 2010=100 for NIC and 2005=100 for HICP. The m/m-12 rates of change of NIC were calculated passing through the splicing coefficients (look at the Methodological Note at the end of this press release), whereas for HICP they were calculated using a time series rebased on 2015 as reference year.

TABLE 1. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC), BY COICOP DIVISION. JUNE 2016, weights, indices and percentage changes (base 2015=100) (a)

Divisions	Weights	Indices	Jun-16 / May-16	Jun-16 / Jun-15	May 16 / May-15	Jun-15 / May-15
Food and non-alcoholic beverages	165,706	100.5	0.1	0.2	0.2	0.1
Alcoholic beverages, tobacco	32,497	102.2	0.4	2.1	1.4	-0.3
Clothing and footwear	71,837	100.4	0.0	0.5	0.5	0.0
Housing, water, electricity, gas and other fuels	114,454	97.3	0.0	-2.4	-2.4	0.0
Furnishings, household equipment and routine household maintenance	71,798	100.3	0.0	0.3	0.3	0.0
Health	86,049	100.4	0.1	0.3	0.3	0.1
Transport	133,218	98.9	0.8	-2.3	-2.9	0.2
Communication	26,950	99.9	-1.0	1.2	1.9	-0.4
Recreation and culture	77,890	100.0	0.1	0.2	0.4	0.3
Education	12,482	100.9	0.0	1.2	1.3	0.1
Restaurants and hotels	114,490	101.4	0.1	0.4	0.6	0.3
Miscellaneous goods and services	92,629	100.1	0.0	0.1	0.1	0.0
ALL ITEMS	**1,000,000**	**99.9**	**0.1**	**-0.4**	**-0.3**	**0.2**

(a) The previous reference base year was 2010=100. The m/m-12 rates of change of NIC were calculated passing through the splicing coefficients (look at the Methodological Note at the end of this press release).

TABLE 2. ITALIAN CONSUMER PRICE INDEX FOR THE WHOLE NATION (NIC), BY TYPE OF PRODUCTS. JUNE 2016, weights, indices and percentage changes (base 2015=100) (a)

Special aggregates	Weights	Indices	Jun-16 / May-16	Jun-16 / Jun-15	May 16 / May-15	Jun-15 / May-15
Food including alcohol:	176,293	100.5	0.1	0.2	0.2	0.1
Processed food including alcohol	105,400	99.9	-0.1	0.0	0.1	0.0
Unprocessed food	70,893	101.3	0.4	0.7	0.4	0.2
Energy:	89,593	94.0	1.1	-7.5	-8.4	0.0
Regulated energy products	46,894	92.4	-0.1	-6.8	-6.7	0.0
Non-regulated energy products	42,699	95.8	2.1	-8.1	-10.0	0.0
Tobacco	21,910	103.2	0.6	2.9	2.0	-0.3
Non energy industrial goods:	249,402	100.5	-0.2	0.5	0.7	0.0
Durable goods	79,828	101.2	-0.2	1.3	1.7	0.2
Non-durable goods	67,677	100.1	0.0	-0.1	0.0	0.1
Semi-durable goods	101,897	100.1	-0.3	0.2	0.4	-0.1
Goods	**537,198**	**99.5**	**0.2**	**-0.8**	**-1.0**	**0.0**
Services related to housing	77,764	100.8	0.1	0.8	0.8	0.1
Services related to communication	20,997	98.8	-0.3	-0.3	-0.2	-0.1
Services related to recreation, including repair and personal care	175,565	101.1	0.4	0.4	0.4	0.4
Services related to transport	73,869	100.0	0.2	0.2	0.2	0.2
Services - miscellaneous	114,607	100.5	0.0	0.5	0.5	0.0
Services	**462,802**	**100.6**	**0.2**	**0.4**	**0.4**	**0.2**
ALL ITEMS	**1,000,000**	**99.9**	**0.1**	**-0.4**	**-0.3**	**0.2**
All items excluding energy and unprocessed food (Core inflation)	839,514	100.5	0.0	0.5	0.6	0.1
All items excluding energy, food, alcohol and tobacco	712,204	100.5	0.0	0.4	0.5	0.1
All items excluding energy	910,407	100.5	0.0	0.4	0.5	0.1
Grocery and unprocessed food	199,682	100.4	0.2	0.2	0.0	0.0

(a) The previous reference base year was 2010=100. The m/m-12 rates of change of NIC were calculated passing through the splicing coefficients (look at the Methodological Note at the end of this press release).

TABLE 3. ITALIAN HARMONIZED CONSUMER PRICE INDEX (HICP), BY COICOP DIVISION. JUNE 2016, weights, indices and percentage changes (base 2015=100) (a)

Divisions	Weights	Indices	Jun-16 / May-16	Jun-16 / Jun-15	May 16 / May-15	Jun-15 / May-15
Food and non-alcoholic beverages	176,326	100.6	0.2	0.3	0.2	0.2
Alcoholic beverages, tobacco	34,597	102.1	0.3	2.0	1.4	-0.3
Clothing and footwear	83,102	109.6	-0.1	0.6	0.5	-0.1
Housing, water, electricity, gas and other fuels	122,032	97.4	0.0	-2.3	-2.3	0.1
Furnishings, household equipment and routine household maintenance	76,724	100.5	0.0	0.2	0.2	0.0
Health	41,506	101.0	0.0	1.0	1.2	0.2
Transport	141,802	98.9	0.8	-2.4	-3.0	0.2
Communication	28,727	100.0	-1.0	1.3	1.9	-0.4
Recreation and culture	60,996	100.1	0.2	0.2	0.5	0.5
Education	13,314	100.8	0.0	1.1	1.2	0.1
Restaurants and hotels	121,889	101.5	0.2	0.4	0.5	0.3
Miscellaneous goods and services	98,985	100.5	0.0	0.1	0.2	0.1
ALL ITEMS	**1,000,000**	**100.8**	**0.2**	**-0.3**	**-0.3**	**0.2**
All items at constant tax rates	1,000,000	100.5	0.2	-0.3	-0.4	0.1

(a) The previous base year was 2005=100. The m/m-12 rates of change of HICP were calculated using a time series rebased on 2015 as reference year.

TABLE 4. ITALIAN HARMONIZED CONSUMER PRICE INDEX (HICP), BY SPECIAL AGGREGATES. JUNE 2016, weights, indices and percentage changes (base 2015=100) (a)

Special aggregates	Weights	Indices	Jun-16 / May-16	Jun-16 / Jun-15	May 16 / May-15	Jun-15 / May-15
Food, alcohol and tobacco:	210,923	100,8	0.2	0.5	0.4	0.1
Processed food (including alcohol and tobacco)	118,753	100,5	0.0	0.5	0.4	-0.1
Unprocessed food	92,170	101,2	0.4	0.6	0.4	0.1
Energy:	95,516	94,0	1.0	-7.5	-8.4	0.0
Electricity, gas, solid fuels and heat energy	54,396	92,9	-0.1	-6.4	-6.3	0.0
Liquid fuels and fuels and lubricants for personal transport equipment	41,120	95,6	2.5	-8.6	-10.7	0.1
Non-energy industrial goods:	258,295	103,5	-0.1	0.5	0.7	0.0
Durable goods	76,635	101,0	-0.1	0.8	1.1	0.2
Non-durable goods	65,826	100,7	0.0	0.6	0.7	0.1
Semi-durable goods	115,834	106,9	-0.4	0.2	0.4	-0.2
Goods	**564,734**	**100,8**	**0.1**	**-0.9**	**-1.0**	**0.0**
Services related to housing	82,915	100,7	0.1	0.7	0.6	0.1
Services related to communication	28,727	100,0	-1.0	1.3	1.9	-0.4
Services related to recreation, including repairs and personal care	164,162	101,2	0.4	0.5	0.5	0.4
Services related to transport	78,534	100,0	0.3	0.2	0.1	0.2
Services - miscellaneous	80,928	100,4	0.0	0.4	0.5	0.1
Services	**435,266**	**100,7**	**0.2**	**0.5**	**0.5**	**0.2**
ALL ITEMS	**1,000,000**	**100,8**	**0.2**	**-0.2**	**-0.3**	**0.2**
All items excluding energy and unprocessed food (Core inflation)	812,314	101,5	0.0	0.5	0.6	0.1
All items excluding energy, food, alcohol and tobacco	693,561	101,7	0.1	0.5	0.6	0.1
All items excluding energy	904,484	101,5	0.1	0.5	0.6	0.2

(a) The previous base year was 2005=100. The m/m-12 rates of change of HICP were calculated using a time series rebased on 2015 as reference year.

TABLE 5. ITALIAN HARMONIZED CONSUMER PRICE INDEX (HICP) BY POPULATION SUBGROUPS (base 2015=100) 2015 - Q1-Q2 2016. Percentage changes (a)

All-items	2015	2015		2016	
		Q3	Q4	Q1	Q2
1st group	-0.1	0.0	0.1	-0.7	-0.7
2nd group	-0.1	0.1	0.1	-0.3	-0.6
3rd group	0.0	0.1	0.1	-0.1	-0.5
4th group	0.0	0.2	0.1	0.1	-0.3
5th group	0.4	0.6	0.4	0.2	-0.1
HICP	**0.1**	**0.3**	**0.2**	**0.0**	**-0.3**

(a) The previous base year was 2005=100. The m/m-12 rates of change of HICP were calculated using a time series rebased on 2015 as reference year.

TABLE 6. REVISIONS OF CONSUMER PRICE INDICES. JUNE 2016, indices and percentage changes (base 2015=100)

	Flash estimates			Final data		
	INDICES	RATES OF CHANGE%		INDICES	RATES OF CHANGE %	
	June 2016	Jun-16 / May-16	Jun-16 / Jun-15	June 2016	Jun-16 / May-16	Jun-16 / Jun-15
Italian consumer price index for the whole nation (NIC)	99.9	0.1	-0.4	99.9	0.1	-0.4
Italian harmonized index of consumer prices (HICP)	100.7	0.1	-0.3	100.8	0.2	-0.2

For more details please refer to the Italian version

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Consumer Price Indices

Methodological note

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

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

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

Reference base year for NIC and HICP

The NIC indices are expressed with 2015=100 as a reference base year[2].
The HICP are calculated and published with 2015=100 as a reference base, as established by the EU Regulation 2015/2010 of the European Commission of 11 November 2015.

Classification for consumer expenditure, basket of goods

Classification of consumption so far used for HICP, NIC and FOI is the international classification COICOP (Classification of Individual Consumption by Purpose), whose hierarchical structure has 3 levels of disaggregation: Divisions, Groups and Classes of product.

Starting from the final data of January 2016, Istat adopts the classification ECOICOP, annexed to the new European framework regulation on harmonised indices of consumer prices and the house price index, currently under approval, that provides for the introduction of an additional level of detail, the subclasses of product.

Already in 2011, Istat, on the basis of the guidelines that were consolidated at European level, with the COICOP Rev.Istat introduced two further levels of disaggregation, the subclasses of product and consumption segments. Since the final data of January 2016, the subclasses of product that Istat uses to classify HICP, NIC and FOI will be those of ECOICOP: although the reduction from 235 to 227, largely they coincide with those introduced in 2011; only 21 are non-connectable with one of the existing subclasses. Even the segments of consumption, representing an articulation of the subclasses of product developed by Istat, have been made consistent with the ECOICOP and they decrease from 326 to 300, of which 280 connectable with the previous ones. Consumption segments are in turn divided into product aggregates, which bring together the products of the Istat basket.

Table 1 shows the new hierarchical structure to the subclasses adopted for the calculation of NIC and FOI compared with that used for the data published up to December 2015.

[1] ISTAT calculates another index named consumer price index for blue- and white-collar worker households (FOI) based on consumption of households whose reference person is an employee.
[2] The FOI indices are expressed with 2015=100 as a reference base year, too.

TABLE 1. CLASSIFICATION OF NIC AND FOI: COMPARISON BETWEEN COICOP REV.ISTAT AND ECOICOP

COICOP Rev.Istat year 2015	ECOICOP year 2016
12 divisions	12 divisions
43 product groups	43 products groups
101 product classes	101 product classes
235 product subclasses	227 product subclasses

Segments of consumption are the most disaggregated level for which NIC indices referring to the entire national territory are disseminated. For HICP indices, the level of detail of the dissemination is that of the product classes, and then it will become, during 2016, taking into account the choices made by Eurostat, the one of the product subclasses. FOI national indices are disseminated for the divisions. At local level (geographical area, region, province), it NIC indices are published up to the product groups and FOI indices, just at provincial level, up to the divisions.

Furthermore, HICP indices by special aggregates (**HICP-SA**) are released. HICP-SA indices are calculated using the same classification scheme and the same method adopted by Eurostat (therefore different from the method used for the calculation of NIC indices by type of products), in order to guarantee comparability among the Italian HICPs and the HICP of the other EU countries and the HICPs for the EU and the euro area produced by Eurostat[3].

As usual, all the data are available on the Istat data warehouse, I.Stat, in the theme 'prices', subtheme 'consumer prices'.

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

Price collection and calculation method for seasonal product price indices

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

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

On the basis of this standard, ISTAT has defined a monthly calendar for the whole 2016, which establishes in a given month when each specific product belonging to the abovementioned product groups or classes must be considered *in season* or *out of season*. The adoption of a seasonality calendar entails that the local consumer price survey is carried out only in months in which the product in question is defined as *in season*, while prices of *out of season* products will be estimated on the basis of a method that is consistent with standards contained in the aforementioned European regulation.

[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=HICP_2000&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=.
The HICP-SA calculation method is described in the HICP Compendium which is downloadable at the following link: http://ec.europa.eu/eurostat/documents/3859598/5926625/KS-RA-13-017-EN.PDF/59eb2c1c-da1f-472c-b191-3d0c76521f9b?version=1.0.
Back series starting from January 2001 are published on I.Stat, the warehouse of statistics produced by ISTAT, inside the theme Prices (http://dati.istat.it).
[4] It has been adopted starting from data referred to January 2011.
[5] It is used for FOI indices, too.

Survey geographical basis and rate of coverage, temporal coverage

Data contributing to the compilation of monthly consumer price indices are traditionally collected in two distinct surveys: the local survey, carried out by Municipal Offices of Statistics, under Istat supervision and coordination, and the central survey, carried out directly by Istat.

In 2016 the geographical basis of the survey is made up of 80 municipalities (19 regional capitals and 61 provincial capitals) – which participate in the indices calculation for all the product aggregates of the basket – and of other 16 municipalities (14 provincial capitals) participating in the survey for a subset of products which includes local tariffs (water supply, solid waste, sewerage collection, gas for domestic use, urban transport, taxi, car transfer ownership, canteens in schools, public day nursery, etc.), some local services (building worker, football matches, cinema, theatre shows, secondary school education, canteens in universities etc.) and automotive fuels.

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

Concerning the basket subset including local tariffs and some local services – whose weight on the NIC basket is equal to 8.9% – with the participation of the other 12 municipalities, the coverage of the survey, measured in terms of provincial resident population, rises to 92.4%.
In the consumer price survey, in 2016, there are more than 42.300 statistical units (including outlets, enterprises and institutions) where the price of at least one product is monitored, as well as around 8.000 dwellings for observing rents. 495.500 prices are sent monthly to Istat by Municipal Offices of Statistics each month.

Prices collected each month directly by Istat are 111.500; among these, about 13.000 are collected using web scraping techniques for consumer electronics products price collection on Internet. The percentage of products observed directly by Istat, calculated according to the weight assigned to each product within the NIC. is 23.6%. Prices are collected at central level for those:

- that do show no variability along national territory or are administered at national or regional level (i.e. tobacco, telephone services, prescription medicines, magazine and other periodicals, some transport services such as national and regional railway transport);
- that are technically too complex to be collected at territorial level because of continuous technology changes (i.e. consumer electronics);
- whose consumption is not strictly linked to the territorial areas (tourist services such as package holidays, bathing establishment etc.).

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

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

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

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

Weighting structure

In the table 1 the weighting structure for the year 2016 of NIC and HICP is reported.

TABLE 1. WEIGHTS USED FOR CALCULATING CONSUMER PRICE INDICES. BY EXPENDITURE DIVISION. YEAR 2016. percentage values

Expenditure divisions	*Weights*	
	NIC	HICP
Food and non-alcoholic beverages	16.5706	17.6326
Alcoholic beverages. tobacco	3.2497	3.4597
Clothing and footwear	7.1837	8.3102
Housing. water. electricity. gas and other fuels	11.4454	12.2032
Furnishings. household equipment and routine household maintenance	7.1798	7.6724
Health	8.6049	4.1506
Transport	13.3218	14.1802
Communication	2.6950	2.8727
Recreation and culture	7.7890	6.0996
Education	1.2482	1.3314
Restaurants and hotels	11.4490	12.1889
Miscellaneous goods and services	9.2629	9.8985
All items	**100.0000**	**100.0000**

Harmonized index of consumer prices at constant tax rates

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

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

The taxes considered in the HICP-CT are those directly linked to final consumption. They are mainly VAT, excise duties and other taxes on some specific items (such as cars and insurance). Subsidies and taxes paid on intermediate stages (e.g. production, transportation) are not taken into account. In principle, fort the compilation of HICP-CT, all taxes should be included and kept constant; however, due to practical consideration, taxes which generate very small tax revenues may not be taken into account. In detail, according to recommendations reported in the Eurostat HICP-CT Manual, taxes which cover less than 2% of the total tax revenue can be excluded. On the whole, included taxes must cover a minimum of 90% total tax revenue. Therefore in the compilation of the Italian HICP-CT, taxes kept constant are the following: VAT, excise duties on tobacco and energy items (fuels, heating oil, gas, electricity, etc.), the main local surcharge on electricity and gas, tax for the public liability insurance and contribution to the National Health Service for transport means insurance. On the basis of National Accounts data taxes which cover less than 1% of the total tax revenue are excluded and, on the whole, taxes included cover almost 98% of total revenues carried out with taxes on final consumption.

The HICP-CT covers the same goods and services as those covered by the HICP. The same weight structure is applied as for the HICP (Table 1). As HICP, it has expressed in 2015=100 as a reference base year.

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

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

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

Indices rates of change calculation

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

- Monthly rate of change (**NIC, HICP**)

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

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

- Annual rate of change (**NIC, HICP**)

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

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

- Annual average rate of change (**NIC**)

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

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

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

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

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

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

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

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

[7] The expressions and the rounding rules described for NIC are also carried out for FOI.

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

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 13 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.

Totally 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

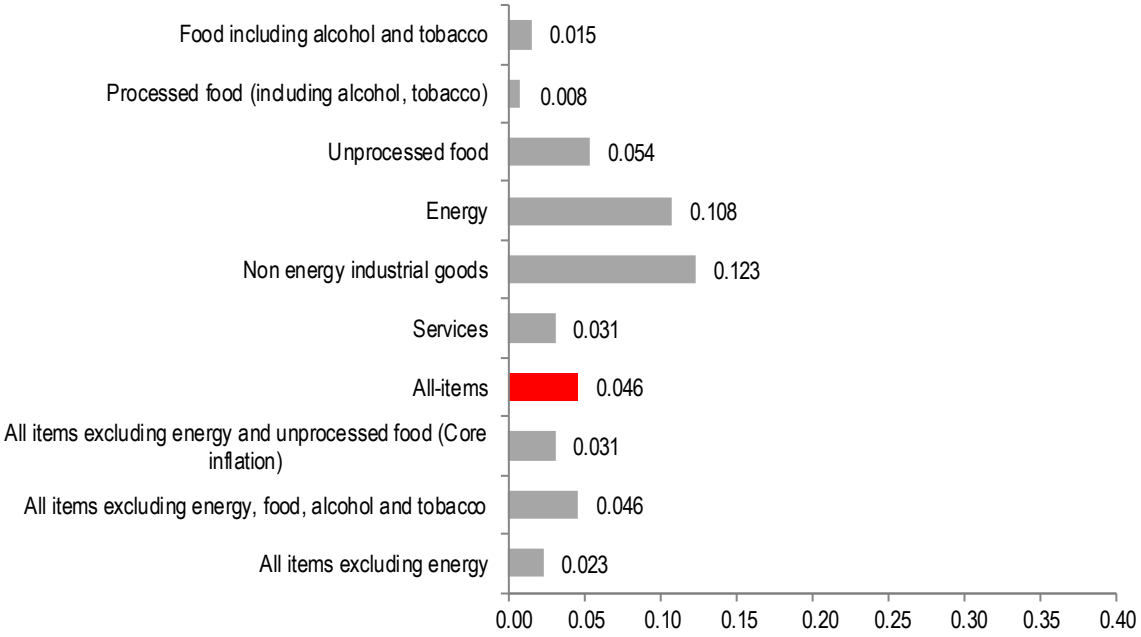
Table 2 compares the flash estimates and the final HICP annual rates of change for the same reference month. Over the last thirteen months, the maximum difference between the flash estimate – all items and the HICP – all items annual rates of change was 0.1. Over the same period, with reference to the main special aggregates, the maximum differences between the flash estimate and the final HICP annual rates of change concerned Energy (0.4 recorded in January 2016, 0.8 in April 2016 and 0.2 in May 2016), Non energy industrial goods (0.5 in August 2015 and 0.2 recorded in September 2015 and in January 2016) and Services (0.3 in January 2016). The differences for Non energy industrial goods together with the highest frequency of revisions (10 months out of 13) are mainly due to the seasonal sales dynamics of Clothing and footwear, for which the partial information available has a higher impact on the flash estimate and therefore it turns out to be less accurate.

TABLE 2. FLASH ESTIMATES AND HICP ANNUAL RATES FOR THE ALL-ITEMS AND MAIN SPECIAL AGGREGATES. JUNE 2015-JUNE 2016, percentage values (Base 2015=100)

Special aggregates		Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16
Food including alcohol and tobacco:	Flash	1.5	1.1	1.3	1.7	2.1	1.6	1.4	0.8	-0.3	-0.4	-0.1	0.4	0.5
	HICP	1.5	1.1	1.3	1.7	2.1	1.7	1.4	0.8	-0.3	-0.4	0.0	0.4	0.5
Processed food (including alcohol, tobacco)	Flash	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0	0.1	0.0	0.1	0.4	0.5
	HICP	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0	0.1	0.1	0.1	0.4	0.5
Unprocessed food	Flash	1.8	1.4	1.7	2.8	3.6	2.6	1.9	0.6	-0.9	-0.8	-0.3	0.4	0.5
	HICP	1.8	1.4	1.8	2.7	3.5	2.7	2.0	0.6	-0,9	-0.8	-0.2	0.4	0.6
Energy	Flash	-5.8	-5.4	-6.4	-7.6	-7.7	-6.8	-5.4	-3.7	-5.5	-7.0	-7.4	-8.2	-7.5
	HICP	-5.8	-5.4	-6.4	-7.6	-7.7	-6.8	-5.4	-4,1	-5.5	-7.0	-8.2	-8.4	-7.5
Non energy industrial goods	Flash	0.9	0.9	1.1	0.3	0.9	0.8	0.8	1.4	0.9	0.8	0.7	0.7	0.4
	HICP	0.9	0.8	0.6	0.5	0.8	0.9	0.8	1.2	1.0	0.9	0.8	0.7	0.5
Services	Flash	0.5	0.7	0.7	0.9	1.0	0.5	0.3	0.5	0.4	0.6	0.5	0.5	0.5
	HICP	0.5	0.7	0.7	0.9	1.0	0.6	0.3	0.8	0.4	0.6	0.5	0.5	0.5
All-items	Flash	**0.2**	**0.4**	**0.5**	**0.2**	**0.3**	**0.1**	**0.1**	**0.4**	**-0.2**	**-0.3**	**-0.3**	**-0.3**	**-0.3**
	HICP	**0.2**	**0.3**	**0.4**	**0.2**	**0.3**	**0.2**	**0.1**	**0.4**	**-0.2**	**-0.2**	**-0.4**	**-0.3**	**-0.2**
All items excluding energy and unprocessed food (Core inflation)	Flash	0.8	0.9	1.1	0.8	1.0	0.7	0.6	1.0	0.4	0.6	0.5	0.5	0.5
	HICP	0.8	0.9	1.0	0.8	1.0	0.7	0.6	0.9	0.5	0.6	0.5	0.6	0.5
All items excluding energy, food, alcohol and tobacco	Flash	0.7	1.0	1.1	0.7	1.0	0.6	0.5	1.0	0.5	0.7	0.6	0.6	0.5
	HICP	0.7	1.0	1.0	0.8	0.9	0.7	0.5	0.9	0.5	0.8	0.6	0.6	0.5
All items excluding energy	Flash	0.8	0.9	1.2	1.0	1.3	0.8	0.7	0.9	0.3	0.5	0.5	0.6	0.5
	HICP	0.9	0.9	1.1	1.1	1.3	0.8	0.7	0.9	0.3	0.5	0.5	0.6	0.5

The Mean Absolute Deviation (MAD) provides another way to measure accuracy. It is calculated as the average of the absolute differences between the flash estimate and the final HICP annual rates of change 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, Non energy industrial goods (0.123 percentage points) and Energy (0.108 percentage points) have recorded the highest MADs.

FIGURE 1. MEAN ABSOLUTE DEVIATION BETWEEN FLASH ESTIMATES AND HICP ANNUAL RATES. JUNE 2015-JUNE 2016, percentage points



The direction of inflation is correctly predicted if both the flash estimate and the final one show increasing (declining or no changing) annual rates of change with respect to those ones calculated in the previous month. There are three possible outcomes for the comparison of the direction of inflation:

- the flash estimate correctly predicts the direction of inflation, so the predicted rise, decline or no change in inflation is confirmed by final data (denoted by 🟢);
- the flash estimate wrongly predicts the direction of inflation, namely it predicts an increase when there is a decrease or vice versa (denoted by 🔴);
- the flash estimate points to an increase or a decrease but the final annual rate of change remains unchanged; or the flash estimate predicts no change in inflation but the final figure points to an increase or a decrease (denoted by 🟡).

Over the last thirteen months, the flash estimate accurately predicted the inflation direction in 120 out of 130 estimates.

TABLE 3. FLASH ESTIMATE PREDICTION CAPACITY OF THE DIRECTION OF INFLATION MEASURED BY HICP. JUNE 2015-JUNE 2016

Special Aggregates	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16
Food including alcohol and tobacco:	●	●	●	●	●	●	●	●	●	●	●	●	●
Processed food (including alcohol, tobacco)	●	●	●	●	●	●	●	●	●	●	●	●	●
Unprocessed food	●	●	●	●	●	●	●	●	●	●	●	●	●
Energy	●	●	●	●	●	●	●	●	●	●	●	●	●
Non energy industrial goods	●	●	●	●	●	●	●	●	●	●	●	●	●
Services	●	●	●	●	●	●	●	●	●	●	●	●	●
All-items	●	●	●	●	●	●	●	●	●	●	●	●	●
All items excluding energy and unprocessed food (Core inflation)	●	●	●	●	●	●	●	●	●	●	●	●	●
All items excluding energy, food, alcohol and tobacco	●	●	●	●	●	●	●	●	●	●	●	●	●
All items excluding energy	●	●	●	●	●	●	●	●	●	●	●	●	●

Computation methodology of flash estimates

For the Italian HICP (and NIC) flash estimate compilation, each month.

- prices collected at local level by around 60 municipalities (out of 80) are used. Out of these municipalities, there are the 38 municipalities which calculate the preliminary local consumer price indices and publish them independently, at the same time of Istat national CPI and HICP release. Data collected by the other 16 municipalities participating in the survey for a subset of products (local tariffs and some local services) are not used; these data are used for the compilation of final indices;
- all prices collected directly by ISTAT (via internet and other sources) are used. These prices refer to 76 product aggregates which cover 21.4% (according to their weights) of the Italian HICP basket (23.1% of the NIC one).

As soon as indices are calculated for aggregate products for which prices are collected directly by ISTAT, product aggregate indices for the municipalities, which participate in the flash estimate of inflation rate, are compiled. For the other municipalities, which do not participate in the flash estimation, product aggregate indices are generally[8] calculated applying to the indices of the previous month, the monthly rate of change of the regional product aggregate indices. The latter are calculated using data of municipalities which participate in the flash estimate, as follows:

$$ {}_R I_h^{m,a} = \sum_{i \in R} \left(\frac{{}_i \pi}{\sum_{i \in R} {}_i \pi} \right) \cdot {}_i I_h^{m,a} $$

where ${}_i I_h^{m,a}$ is the elementary index of product aggregate *h* at municipality level *i* of the reference month *m* of year *a* and $\frac{{}_i \pi}{\sum_{i \in R} {}_i \pi}$ is equal to the share of resident population in the municipality *i* of region *R* on the total resident population of the region.

As soon as product aggregate indices of all municipalities are compiled, regional and, then, national indices are calculated (by product aggregates, by upper aggregates and for all items).

If all municipalities of a certain region are not included in the flash estimate, the product aggregate indices of this region are calculated applying to the indices of the previous month, the monthly rate of change of

[8] For some product aggregates – among others, rents and local tariffs such as water supply, solid waste, sewerage collection, urban transport services by road – for the municipalities that do not participate in the flash estimation, indices are estimated by carrying forward the price of the previous month. The adoption of this different estimation technique is due to the fact that the evolution of prices in the other municipalities of the same region is not considered a satisfactory proxy.

national product aggregate indices. The latter are calculated using data of regions which participate in the flash estimate, as follows:

$$I_h^{m,a} = \sum_{R=1}^{20} \left(\frac{{}_R\pi_h}{\sum_{R=1}^{20} {}_R\pi_h} \right) \cdot {}_R I_h^{m,a}$$

where ${}_R I_h^{m,a}$ is elementary index of product aggregate *h* at regional level of the reference month (*m*) of year (*a*) and $\frac{{}_R\pi_h}{\sum_{R=1}^{20} {}_R\pi_h}$ is equal to the share of household consumption expenditure for the product aggregate *h* in the region *R* on the national household consumption expenditure for the same product aggregate.

Once product aggregate indices of all regions are compiled, national indices are calculated (by product aggregates, by upper aggregates and for all items).

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 by sorting households on the basis of the amount of equivalent expenditure (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 differ with 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), which involved, in 2014, an actual sample of about 17,000 households[9].

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 203 cases; in other cases). 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, twice a year, 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 the total expenditure level of the households.

Regarding the weights, estimated for the compilation of indices for 2016, figure 2 shows that the share of expenditure for food and energy goods is inversely correlated with the level of total expenditure. In more

[9] Until the estimation of 2015 weights (based on 2013 HBS data), it has been taken into account the information coming from the HBS survey design previous to the new one presented by Istat on the 8th of July 2015. The results of the new sampling design and the new data collection methodology will be used as basis for the estimation of the HICPs of population subgroups starting from 2016.

[10] In Italian HICP classification scheme, aggregates of products are 404.

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 food and energy goods 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 transport, Services miscellaneous and, to a lesser extent, the incidence of the Services related to recreation, culture and personal care increase together with the increase of the level of total expenditure.

FIGURE 2. HARMONIZED INDICES OF CONSUMER PRICES. WEIGHTS OF THE SPECIAL AGGREGATES INDICES FOR POPULATION SUBGROUPS (per million). YEAR 2016