

III Outline of the 2020-Base Consumer Price Index*

1 Characteristics of the index

The Consumer Price Index (CPI) is calculated by comprehensively measuring the price fluctuation of goods and services purchased by households nationwide in the time series. It reflects changes of the cost of purchasing goods and services in a fixed “consumption patterns.”

2 Outline of the index

2.1 Scope of the CPI

Since the CPI measures the price changes affecting the lives of households as consumers, the scope should include the living expenditures of a household economy (religious contributions, donations, money gifts, other obligation fees and remittances are excluded).

Thus, expenditures such as direct taxes and social insurance premiums (non-consumption expenditure), security purchases, land and housing purchases (expenditure for saving and property purchases) are not included in the scope of the CPI.

Housing cost of owner-occupied housing is incorporated into the index by the “Imputed rent” approach.

2.2 Index formula

The index is calculated as the weighted arithmetic mean with a fixed basket in the base period preceding the comparison period (Laspeyres formula).

$$I_t = \frac{\sum_{i=1}^n p_{t,i} q_{0,i}}{\sum_{i=1}^n p_{0,i} q_{0,i}} \times 100 = \frac{\sum_{i=1}^n \frac{p_{t,i}}{p_{0,i}} w_{0,i}}{\sum_{i=1}^n w_{0,i}} \times 100$$

I : index
 p : price
 q : quantity
 w : weight (= pq)
 i : item
 0 : base period
 t : comparison period

Of the two different methods to calculate indices, one is the fixed-base method, in which indices are calculated with the rate of consumption expenditure in the base year as the weight. The other is the chain-linking method in which the index of the current year, calculated based on the rate of consumption expenditure in the previous year as the weight, is multiplied every year. In the consumer price index, the indices given by the fixed-base method are published for measuring the price fluctuations with the fixed consumption patterns and the indices given by the chain-linking method, which reflect changes in consumption patterns every year, are also published as reference indices.

2.3 Index base period and weight reference period

Both the index base period and the weight reference period are the calendar year of 2020. The weight is calculated from the average monthly expenditure by item per household in 2019* and 2020, which is mainly obtained from the Family Income and Expenditure Survey (Fundamental Statistical Survey based on the Statistics Act).

* Conventionally, they are calculated based on the average consumption expenditure in the base period, but in consideration of the impact of the COVID-19 infections, they are calculated by also using the consumption expenditures in 2019 in addition to those in 2020.

2.4 Index items

The number of items used for the calculation of the index (hereinafter referred to as “index items” or simply “items”) totals 582. Items are selected with consideration of the importance of each item relative to total living expenditure, the representativity of price movements and feasibility of price data collection, in order to represent the price movement of all goods and services purchased by households.

* See “2020-Base Explanation of the Consumer Price Index” for more methodological information.
URL: <https://www.stat.go.jp/english/data/cpi/1590.html>

2.5 Price data

In principle, the prices of index items are derived from the retail prices of each municipality and the items obtained by the Trend survey in the Retail Price Survey (Fundamental Statistical Survey based on the Statistics Act). Note that the number of surveyed municipalities (villages, towns and cities, collectively referred to as “municipalities”) is 167.

As for seven items, “TV sets”, “Video recorders”, “Personal computers (desktop)”, “Personal computers (notes)”, “Tablet computers”, “PC printers” and “Cameras”, the prices of all products sold at major electric appliances shops in Japan, obtained from scanner data from the POS information* are used. As for three items, “Airplane fares”, “Hotel charges” and “Charges for package tours to overseas”, the online sales prices collected by web scraping* are used.

* POS information: Scanner data gathered by the private Point of Sale system.

* web scraping: Computer software technology that extracts information from websites.

2.6 Index calculation

Firstly, the indices for the smallest groups are calculated by averaging the item indices, which are calculated by dividing the price in the comparison period by the price in the base period, with a weight assigned to each item in the group.

Secondly, indices thus obtained are averaged with weight for each group, to obtain the indices for the groups immediately above the smallest groups. Repeating the same procedure, the indices for the minor groups, subgroups, the 10 major groups and all items index are obtained in succession.

In the case of the Japan index, the index is calculated as follows: First, the index of the relative price by item is calculated for each municipality and then averaged with the respective weight for each municipality to obtain the average price index by item nationwide. Then this index is averaged with weight for each item for Japan to obtain upper level groups and the all items index. The same procedure is also taken for the city classes and districts.

3 Index groupings

As for basic classification indices, all items, 10 major groups, subgroups, minor groups and individual items are calculated for Japan and the Ku-area of Tokyo.

In addition, as for city groups, districts, cities with prefectural governments (excluding the Ku-area of Tokyo), and part of the government ordinance–designated cities, indices for all items, 10 major groups and subgroup indices are calculated.

Goods and services group indices are calculated for Japan and the Ku-area of Tokyo. Indices aggregated based on baskets of specific household groups for Japan, and indices by the characteristic of items for Japan are also available. CPI calculated by Laspeyres’ Chain Index method for Japan is compiled for reference.

Seasonally adjusted indices such as “all items”, “all items, less fresh food”, “all items, less fresh food and energy” are also calculated for Japan and Ku-area of Tokyo.

4 Publication of the CPI

In principle, the index figures of the preceding month for Japan are released at 8:30 A.M. (Japan time) on Friday of the week including the 19th of each month. Moreover, the preliminary figures of the current month for the Ku-area of Tokyo are released at 8:30 A.M. (Japan time) on Friday of the week including the 26th of each month in principle.