

I 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 in the cost of purchasing goods and services in a fixed “consumption patterns”.¹

2 Outline of the index

(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 economy² (religious contributions, donations, money gifts, and 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 (refer to “I [Reference] Treatment of the housing services of owner-occupied houses”).

(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 price fluctuations with 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.³

¹ The International Labour Organization (ILO) set up the international standards for the consumer price index (refer to “VIII 1 Resolution concerning consumer price indices, adopted by the 17th International Conference of Labour Statisticians (2003) - excerpt-”). Japan also uses these standards for the consumer price index.

² Indirect taxes such as consumption taxes collected when goods and services are purchased are included in the consumer expenditure.

³ Unless otherwise specified, in this document the index represents those which are calculated by the fixed-base method. For details

(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 mainly calculated from the average monthly expenditure by item per household in 2019⁴ and 2020, which is obtained from the Family Income and Expenditure Survey (FIES) (Fundamental Statistical Survey based on the Statistics Act (Law No. 53, 2007, hereinafter the same) (refer to “III Chapter 4 Calculation of the weight (W_0)”).

(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.

As for the items, refer to “IV 1 List of information for items of the 2020-Base Consumer Price Index”.

(5) Price data

a) 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) (refer to “VII Outline of Retail Price Survey (Trend Survey)”).

Note that the number of surveyed municipalities (villages, towns, and cities, collectively referred to as “municipalities”) is 167 (refer to “IV 2 List of municipalities for the price survey”).

b) 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 information⁵ are used.

c) As for three items, “Airplane fares”, “Hotel charges”, and “Charges for package tours to overseas”, the online sales prices collected by web scraping⁶ are used.

(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 (refer to “III Chapter 1 Calculation of the prices in the comparison period (P_t)”) by the price in the base period (refer to “III Chapter

of the index calculated by the chain-linking method, refer to “III Appendix 5 Calculation of the CPI by Laspeyres’ Chain Index method”.

⁴ 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.

⁵ Scanner data gathered by the private Point of Sale system.

⁶ Computer software technology that extracts information from websites.

3 Calculation of the prices in the base period (P_0), with a weight assigned to each item in the group. Secondary, 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 indices by city classes and districts.

3 Index grouping

(1) Basic classification indices

a) 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 65 groupings of city groups (4 groupings), districts (10 groupings), cities with prefectural governments (excluding the Ku-area of Tokyo), and part of the government ordinance-designated cities (Kawasaki-shi, Sagamihara-shi, Hamamatsu-shi, Sakai-shi, and Kitakyushu-shi) (51 groupings), indices for all items, 10 major groups, and subgroup indices are calculated.

For the classification of city groups and districts, refer to “IV 2 List of municipalities for the price survey”.

b) Indices for items such as “All items, less fresh food”, “All items, less imputed rent”, “All items, less imputed rent & fresh food”, “All items, less fresh food and energy”, and “All items, less food (less alcoholic beverages) and energy” are calculated as the analytical series of basic classification indices.

(2) Indices for goods and services groups

a) Goods and services group indices are calculated for Japan and the Ku-area of Tokyo.

b) Indices for items such as “Public utilities charges” and “Services, less imputed rent” are calculated as the analytical series of goods and services classification indices.

(3) Indices aggregated based on baskets of specific household groups

The following indices are calculated for Japan:

a) Subgroup Index for Total Households⁷

b) Subgroup Index by Yearly Income Quintile Group of Worker’s Households

c) 10 Major Group Index by Age Groups of Household Head

d) 10 Major Group Index by Types of Tenure of Dwelling

⁷ Total households include both one-person households and two-or-more-person households.

(4) Indices by the characteristic of items

The following indices are calculated for Japan:

- a) Indices by goods group classified according to the elasticity to living expenditure
- b) Indices of annual purchase frequency classes

(5) Seasonally adjusted indices (Fixed-base method)

The indices of the following five groupings are calculated for Japan and the Ku-area of Tokyo:

< Basic classification index >

- All items
- All items, less fresh food
- All items, less fresh food and energy

< Goods and services group index >

- Goods
- Services

(6) Reference indices

The indices for the following basic classification are calculated for Japan:

CPI calculated by Laspeyres' Chain Index method

(7) Others

The following indices are calculated:

- a) Seasonally adjusted indices (Indices calculated by Laspeyres' Chain Index method)⁸
- b) Subgroup index (2015-base)⁹ (Japan and Ku-area of Tokyo)
- c) 5 major group indices (prewar base) (Ku-area of Tokyo)
- d) COICOP classification index (Japan)

4 Publication of the CPI¹⁰

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.¹¹ 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.

The average index figures for the calendar year and fiscal year are released when the monthly figures for December and March are released respectively.

⁸ Indices for "All items", "All items, less fresh food", and "All items, less fresh food and energy" are calculated.

⁹ The 2015-base conversion subgroup indices are released when the monthly figures for January 2022 are released.

¹⁰ The released indices are also available at the Portal Site of Official Statistics of Japan "e-Stat" (<https://www.e-stat.go.jp/>) with the database and API functions.

¹¹ Since January 2018 result, the CPI for Japan has been released a week earlier than before. Until December 2017, the release date was Friday of the week including the 26th of each month.

- (1) Report on the CPI (leaflet)..... This report contains basic classification indices, goods and services group indices for Japan and the Ku-area of Tokyo. It is published on the date of release as printed literature and is also available on the Internet website.
- (2) Monthly report on the CPI..... This report contains indices of all groupings and time series indices of major groupings of the month concerned. This is available only on the Internet website.
- (3) Annual report on the CPI (leaflet)... This report contains monthly and yearly indices and time series indices of major groupings. It is published in the spring of the following year, and is also available on the Internet website.

[Reference] Treatment of the housing services of owner-occupied houses

To include the housing cost of owner-occupied housing in the price index, the imputed rent index and the all items index¹² including the imputed rent have been calculated since 1970 by the imputed rent approach.

In the Family Income and Expenditure Survey (FIES), which is used for calculating weights of the CPI, the purchase of housing is regarded as a purchase of property (capital accumulation), not included in the living expenditure. However, shelter services derived from houses purchased instead of renting houses are considered to account for a large portion of actual consumption, so it may not be reasonable that it is not included only because of lack of monetary transaction. Therefore, the housing services of owner-occupied housing are incorporated into the CPI considering they are equivalent to house rents of similar houses, which is called the “imputed rent” approach.

The treatment of housing cost of owner-occupied housing in the CPI differs by countries. The ILO manual, the “Consumer Price Index Manual: Theory and Practice” published by the International Labour Organization (ILO) in 2004, indicates that there are three approaches to address the housing cost of owner-occupied housing, i.e. (i) acquisition, (ii) payment, and (iii) use. In Japan, focusing on approach (iii), the housing cost of owner-occupied housing is incorporated into the CPI as a necessary rental cost if the owner occupied housing is rented housing.

In the actual index calculation, the imputed rent, estimated by the National Survey of Family Income, Consumption and Wealth¹³ (a fundamental statistical survey based on the Statistics Act), which is conducted one year before the base year (every five years), is used for the weight (refer to “III Appendix 4 Calculation of the weights for imputed rent”), and the rent of house rent, private surveyed in the RPS (Trend) is substituted for the monthly price in the comparison period (refer to “III Appendix 1 Calculation of model items”).

¹² Since 1985-base, “All items, including imputed rent”, which had been calculated as a reference grouping, has been used as the “All items” index, and “All items, less imputed rent” is treated as the analytical series of the basic classification index.

¹³ In the 2020-base revision, 2019 result was used.