

Chapter 4 Calculation of the weight (W_0)

1 Scope of the Family Income and Expenditure Survey (FIES) items adopted for the weights

In the FIES, living expenditures are categorized as follows:

Disbursements
Expenditures
Consumption expenditures
Food, Housing, Fuel, light & water charges, Furniture & household utensils, Clothing & footwear, Medical care, Transportation & communication, Education, Culture & recreation, Other consumption expenditures (Miscellaneous, Pocket money (of which, detailed uses unknown), Social expenses, Remittance)
Non-consumption expenditures
Direct taxes, Social insurance premiums, Other non-consumption expenditures
Disbursements other than expenditures (excluding carry-over to next month)
Savings, Insurance premium payments, Purchase of securities, Repayment of loans for house & land purchases, Repayment of loans for other debts, Repayment of loans for purchase on credit, Purchase of properties, Others
Carry-over to next month

As the CPI is designed to measure changes in prices of goods and services consumed by household throughout the country, the scope of the FIES items used for the calculation of weights is limited to the household consumption expenditure.¹⁹ The CPI does not cover non-consumption expenditures (e.g., direct taxes and social insurance premiums) or disbursements other than expenditure (e.g., security purchases, purchase of houses and land).

Also, the following items of consumption expenditure are excluded from the scope of the CPI because markets do not generally exist for such items, the relationship between payment and counter value is not clear or they involve income transfer to other households.

a) Religious contributions:

Religious contributions cannot be specified, because the costs such as donations to religious association and offerings to temples or churches do not have any concrete values and the amounts are arbitrary.

b) Donation

Donations such as general donations and community chest cannot be specified because they have no concrete counter value and the amounts are arbitrary, just as for religious contributions.

c) Money gifts

Money gifts such as betrothal money, farewell gifts, consolation payments, and gratuity (tips) are income transfer, not a purchase of goods or a counter value of services. They will be re-spent by the household receiving them, and it seems that their spending patterns are approximated by the consumption structure which is the basis of the consumption of weights.

¹⁹ Consumer expenditure includes indirect taxes such as consumption taxes collected in an integrated manner when goods and services are purchased. Therefore, the amount of expenditure by item includes the indirect taxes collected for each item.

d) Other obligation fees

Obligation fees such as fees for neighborhood association, firefighting, and street lamps are a kind of public duties. The concept of price is not applied to them.

e) Remittances

Remittances such as education expenses, house rent and living expenses for students studying away from home are income transfer and not counter values.

2 Calculation of the weights for the basic classification indices

In order to distinguish the municipalities used in CPI and FIES, the municipality used in the RPS (Trend) for the CPI is referred to as the “CPI municipality” and that used in the FIES is referred to as the “FIES municipality”.

(1) Calculation of the weights by FIES municipality

Via the following procedure, the weights for the FIES municipality are calculated before calculating the weights by CPI municipality.²⁰

a) Allocation of expenditure by item in the FIES to the CPI items

The weight allocated to each item is calculated on the basis of the 2019²¹ and 2020 yearly average of monthly expenditures by item per household, derived from the FIES (two-or-more-person households).

However, the coverage of items which the FIES uses for the classification (hereinafter referred to as FIES items) and the CPI items differs partially. Moreover, items called “Other xxx” in the FIES are not included in the CPI items. Thus, the FIES items and CPI items do not correspond as 1 to 1. Therefore, expenditures by item in the FIES are allocated to the CPI items as shown below.

There are two types of rate of allocation, for Japan, and for districts or municipalities. As for details of the allocation, refer to “IV 6 Division and integration of the FIES items to the CPI items”.

1) When there is 1 to 1 correspondence between the FIES item and the CPI item, the correspondence is maintained.

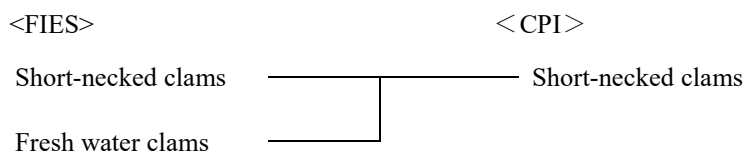
<FIES>		<CPI>
Tuna fish	—————	Tuna fish
Horse mackerel	—————	Horse mackerel
Sardines	—————	Sardines

²⁰ The stratum used for extracting the CPI municipality coincides with the stratum used for extracting the FIES municipality. The “stratum” is a segment of the municipalities across Japan classified according to the size of population, geographical locations, industrial characteristics, etc. to extract the surveyed municipality.

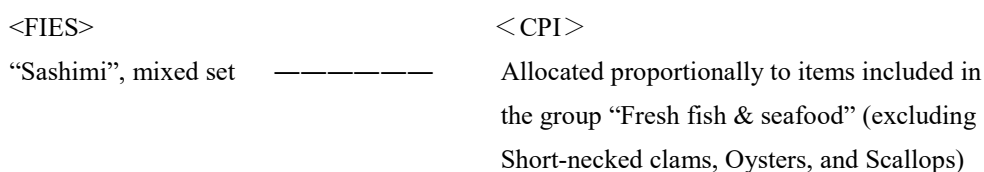
²¹ Conventionally, they are calculated based on the average consumption expenditure in the base period, but in consideration of the impact of the COVID-19 infections, they are calculated by also using the consumption expenditures in 2019 in addition to those in 2020.

2) When there are no CPI items corresponding to the FIES items, items are allocated as follows:

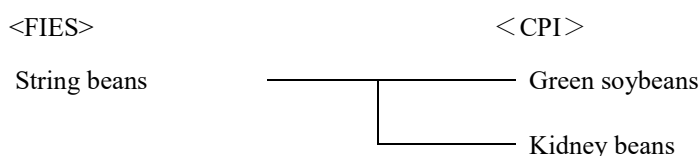
- When there is a CPI item that represents the FIES items, weights of those items are combined to the CPI item.



- When a CPI item which represents FIES items cannot be specified, weights are allocated proportionally²² to each item in the index group in question.

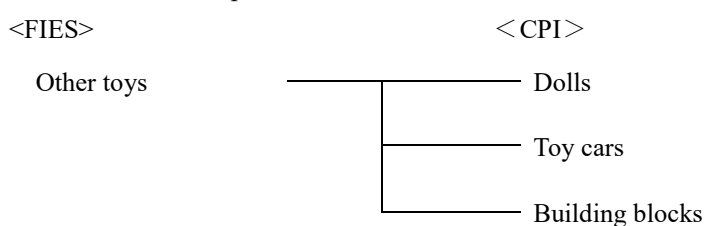


- When several CPI items correspond to one FIES item, the rates of allocation are determined by expenditure ratios which are obtained from other statistics, such as special tabulation of the FIES and the National Survey of Family Income, Consumption and Wealth (NSFICW).

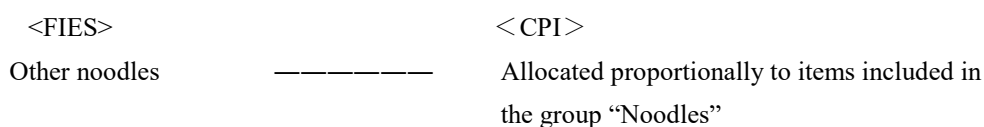


3) Weights of items called “Other xxx” in the FIES are allocated as follows:

- When several CPI items are included in the item called “Other xxx” in the FIES, the rates of allocation are determined by expenditure ratios, which are obtained from other statistics such as special tabulation of the FIES and the NSFICW.



- When there are no CPI items included in the item called “Other xxx” in the FIES, weights are allocated proportionally to each item in the index group in question.



²² Weights are allocated in proportion to expenditures already assigned to the CPI items included in the group in question.

4) “Pocket money” and “Social expenses” in the FIES are allocated to CPI items by the rates of allocation on the basis of “personal living expenditure” in the NSFICW.

“Package tours (domestic)” are divided into hotel charges, transportation fares, costs of meals and others using data from other statistics and allocated to the corresponding group and items.

b) Inclusion of weights for the imputed rent

Weights for the imputed rent by municipality of the FIES, which are calculated based on the “Imputed rent” in the NSFICW, are included.

As for details of the calculation, refer to “III Appendix 4 Calculation of the weights for imputed rent”.

(2) Calculation of the weights by municipality in the CPI

Using the weights by the FIES municipality obtained from the calculation above (1), weights by the CPI municipality are calculated as follows:

a) Correspondence of the FIES municipalities to the CPI municipalities

Weights for cities with prefectural governments, Kawasaki-shi, Sagami-hara-shi, Hamamatsu-shi, Sakai-shi, and Kitakyushu-shi are corresponded directly. As for other cities, the average figures of “the district and the city group”, created from the FIES for municipalities, to which the municipality in question belongs are corresponded.

b) Correction depending on the actual situation of the CPI municipalities

Weights for several items, such as house rent, public, sewerage charges, and septic tank cleaning fees are corrected and redistributed, depending on the actual situation of the municipality.

c) Adjustment depending on the scale of the stratum

Weights for each CPI municipality, as calculated above, cannot be used for the official indices for Japan because the scale of the stratum where each municipality is sampled in the FIES is not reflected. Therefore, final weights by the CPI municipalities are calculated by multiplying coefficients²³ that are proportional to the scale of each stratum (the number of two-or-more-person households).

(3) Calculation of monthly weights for fresh food

Since monthly purchase quantities greatly fluctuate by item, the monthly weights of fresh food are calculated with the following procedure.

a) Calculation of purchase quantity ratio

Using purchase quantities obtained from the FIES, the ratio of purchase quantity of each month to the yearly average of monthly purchase quantity is calculated by item.

²³ In the FIES, the number of households for tabulation after the adjustment for each stratum (surveyed municipalities) is proportional to the scale of the stratum (the number of target households). Therefore, the coefficient used is the ratio of the number of households for tabulation after adjustment to the total households of Japan (per 10,000).

$$q_{m,i} = \frac{q_{(2019,m),i} + q_{(2020,m),i}}{2}$$

$$r_{m,i} = \frac{q_{m,i}}{\frac{1}{12} \sum_{m=1}^{12} q_{m,i}}$$

(r : Annual average ratio of purchase quantity, q : Purchase quantity, i : Item, m : Month)

The average of two years (2019 and 2020) is used for purchase quantity.

b) Calculation of monthly weights

Multiplying the monthly purchase quantity ratio obtained from the above a) by the annual average weight by item, the monthly weight by item is calculated.

$$w_{m,i} = w_i \times r_{m,i}$$

($w_{m,i}$: Monthly weights before group adjustment, w_i : Annual average item weight)

c) Adjustment to group weights

Although group weights for “Fresh fish & seafood”, “Fresh vegetables”, and “Fresh fruits” are fixed all year round, the sum of monthly weights by item obtained from the above b) does not coincide with the group weights calculated by the annual average. To avoid this inconsistency, monthly adjustment ratios are calculated and multiplied by item weights for the corresponding month, whereupon final monthly weights are calculated.

$$w'_{m,i} = w_{m,i} \times \frac{W}{\sum_{i=1}^n w_{m,i}}$$

($w'_{m,i}$: Monthly weights, W : Annual average weight for upper level group)

3 Calculation of the weights for the goods and services group indices

Weights for the goods and services group indices are calculated by adding weights for individual items in the basic classification by goods and services group.

4 Calculation of the weights for index based on baskets of specific household groups

Weights for Japan are calculated by the following categories.

- Total households
- Yearly Income Quintile Groups of Workers' Households

- By Age Groups of Household Head
- By Types of Tenure of Dwelling of Household Head

To calculate weights, the 2019²⁴ and 2020 yearly average of monthly expenditures by item per household by each category in the FIES are used and the target households are composed of two or more persons, except for the total household weights.

The allocation method from FIES items to CPI items and rates of allocation are the same as weights for Japan for the basic classification.

²⁴ 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 (same as the weights for the basic classification indices).