

Introduction

- The CPI in Japan is calculated using the fixed-base method (Laspeyres formula), and the base period of the index is revised every five years, in years with 0 or 5 as the final digit.
- This poster introduces a series of processes from considerations to determine new weights under the conditions of the COVID-19 pandemic to the validation of the current weights in the interim year.

1. Estimation of New Weights with 3 Methods for the 2020-Base Revision

- The 2020-base weights would normally be computed using the results of the 2020 Family Income and Expenditure Survey, etc.
- However, the consumption structure of households changed significantly due to the outbreak of COVID-19 infections in 2019, and it became necessary to take this impact into account in the 2020-base revision.
- In this revision, we tried the following three methods to estimate **new weights (per 10,000) for the 10 major groups**:
 (1) Consumption expenditures in 2020 (the conventional method), (2) Average of consumption expenditures for multiple years (2019 and 2020), and (3) Outlier-processed consumption expenditures in 2020*
 *Processed mechanically using the pre-adjustment function in the seasonal adjustment software X-12-ARIMA

Table 1. Estimation of weights for the 10 major groups (per 10,000)

	Released values	Estimated values (Values in parentheses are percentage changes relative to 2019)		
	2019	(1) 2020	(2) Avg. for 2019 and 2020	(3) Outlier-processed
Food	2,628	2,711 (3.2)	2,670 (1.6)	2,734 (4.0)
Housing	2,012	2,102 (4.5)	2,051 (1.9)	2,085 (3.6)
Fuel, light & water charges	689	712 (3.3)	699 (1.5)	706 (2.5)
Furniture & household utensils	373	420 (12.6)	396 (6.2)	406 (8.8)
Clothes & footwear	376	319 (- 15.2)	348 (- 7.4)	337 (- 10.4)
Medical care	461	485 (5.2)	472 (2.4)	480 (4.1)
Transportation & communication	1,547	1,476 (- 4.6)	1,516 (- 2.0)	1,466 (- 5.2)
Education	302	316 (4.6)	311 (3.0)	310 (2.6)
Culture & recreation	995	863 (- 13.3)	926 (- 6.9)	879 (- 11.7)
Miscellaneous	617	595 (- 3.6)	610 (- 1.1)	596 (- 3.4)

[Results of the Estimation]

“(1) 2020” showed sharp fluctuations compared to the previous year for many classifications, but in “(2) Average for 2019 and 2020” and “(3) Outlier-processed,” the estimated weights were generally adjusted to mitigate the fluctuations in (1).

When experts and economists in Japan were asked for their opinions regarding these estimations, **the method “(2) Average for 2019 and 2020”** received the most approvals. It was therefore adopted, and the 2020-base revision including this weighting was implemented in August 2021.

2. Validation of the Current Weights in 2022 for the 2020-Base CPI

- In 2022, an interim-year review of the 2020-base CPI was conducted from the following two perspectives.
 - To examine goods and services showing rapid growth or decline for reflection in the index items
 - To compare the current fixed-base Laspeyres index using average weights for 2019 and 2020 with the chain Laspeyres index

2.1 Examination of Goods and Services Showing Rapid Growth or Decline in Consumption for Reflection in the Index Items

- In Japan, the items used in the CPI are revised in the base revision, and 582 items are used for the 2020-base calculation.
- Goods and services showing rapid growth or decline in consumption are quickly reflected in the index as needed in the interim year, before the next base revision.
- As a result of examination with data from the Family Income and Expenditure Survey, which is used to determine the weights, all of the items that showed a large increase or decrease in expenditure were considered to have been affected by the unusual circumstances caused by the COVID-19 pandemic.
- Since it was not certain whether their state of growth or decline would remain unchanged going forward, **it was decided not to add or eliminate index items in the interim review.**

Table 2. Goods and services showing increase in consumption

Status of adoption for the index items	Items showing rapid increase in consumption	2018→2019→2020→2021
1. Not adopted for the 2020-base index items	- Wet wipes*	[1.5→ — → 3.8→ 2.8]
	- Sterilization and disinfection solution (for household use) *	[0.8→ — → 2.6→ 1.2]
	- Hand sanitizer*	[0.2→ — → 3.9→ 1.2]
	- Medical thermometer*	[0.3→ — → 1.6→ 0.9]
2. Adopted for the 2020-base index items	- “Chu-hi”, liquor with soda & fruit, & cocktail	[9.6→10.7→ 14.9→ 15.5]
	- Masks*	[3.2→ — → 26.5→ 16.4]
	- Game softwares	[4.5→ 4.5→ 7.1→ 6.6]
	etc.	

Note: The values in brackets are ratios per 10,000 in the order of 2018, 2019, 2020, and 2021. The values of items with asterisks were not calculated in 2019.

(Source) Yearly average results for households of two persons or more in the Family Income and Expenditure Survey

Table 3. Goods and services showing decrease in consumption

Income and expenditure items	Corresponding index items	2018	2019	2020	2021
1. Charges for package tours to overseas	Charges for package tours to overseas	46.3	47.9	6.8	0.2
2. Neckties	Neckties	1.4	1.2	1.0	0.8
3. Women's stockings	Women's stockings	1.6	1.5	1.1	0.9
4. Suitcases	Suitcases	2.9	2.6	1.1	0.9

Note: Values are ratios per 10,000.

(Source) Yearly average results for households of two persons or more in the Family Income and Expenditure Survey

2.2 Comparing the Fixed-Base Laspeyres Index (Current Index) and the Chain Laspeyres Index

- There was no major difference between the fixed-base index and the chain index, comparing trends of YoY changes in both indices. (The maximum difference is ±0.2 point in YoY changes after 2021.)
- Based on the fact that it is unclear at this time how the impact of the COVID-19 pandemic and the spending structure of households will change in the future, **it was concluded to continue the use of the current weights in calculating the fixed-base index for the 2020-base CPI.**

Figure 1. Trends of YoY changes in the indices

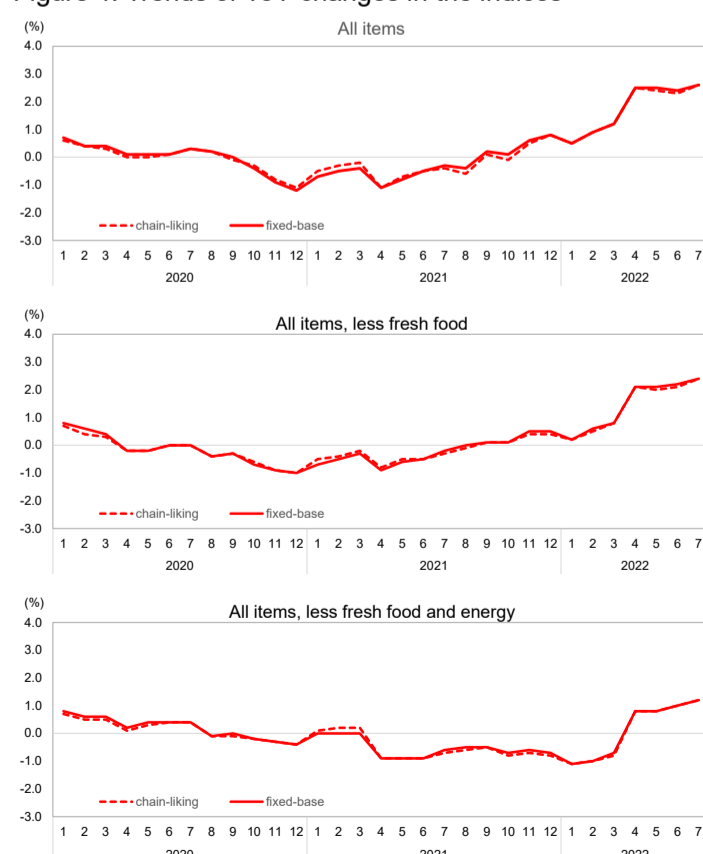


Figure 2. Difference in YoY changes (fixed-base – chain)



Conclusion

- The current weights, calculated using the average consumption expenditures of households in 2019 and 2020, were examined for their validity in the interim year as described above and found to be unproblematic.
- As a result, the decision was made to continue the use of the current weights until the 2025-base revision (scheduled to be conducted in 2026).