Chapter 7 Seasonal adjustment

1 Seasonal variation and seasonal adjustment

   Price fluctuation is partially affected by specific seasonal price movement[40] (seasonal variation). Comparison of a month of the current year and the same month of the previous year is one way of eliminating the seasonal price movement from the CPI. An alternative way is to estimate seasonal variation and remove it from the index (seasonally adjusted index). There are various ways to estimate seasonal variation, and the 2015-base CPI is seasonally adjusted in the method described below.

2 Calculation of seasonally adjusted indices

   A program developed by the Census Bureau of the U.S. called X-12-ARIMA is used for seasonal adjustment. Refer to "III Appendix 5 Details of seasonal adjustment with X-12-ARIMA" for the specification file.

3 Data used to calculate seasonally adjusted indices

   The indices after January 2010 are used to calculate seasonally adjusted indices. For the indices from January 2010 to December 2014, the 2015-base linked index is used for each series as shown in the following equation:

$$\text{2015-base linked index (Original grouping for seasonal adjustment}^{41}) = \text{2010-base index} \times \frac{100}{\text{2015 average index (2010-base)}}$$

4 Recalculation of seasonally adjusted indices

   The seasonal adjustment indices of time sequential data released every month are calculated by dividing the monthly original series in the current year by a seasonal factor from January to December of the current year (estimated seasonal index[42]), obtained from data from January of the beginning year of 2010 to December of the previous year. After that, when the data throughout the year from January to December is available, all seasonally adjusted indices including these new data are recalculated to readjust the seasonally adjusted indices. In this manner, all values after January of the beginning year of 2010 are adjusted by recalculating with new data added every year.

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[40] For example, the price of clothes tends to drop near the change of seasons.
[41] Indices before rounding fractions are used for the original series.
[42] The seasonally adjusted index is calculated using the (estimated) seasonal index before the rounding of fractions. The seasonally adjusted index is rounded off to one decimal place. The ratio of the seasonally adjusted index for the preceding month is calculated with the index before rounding fractions, and the index is rounded off to one decimal place.

5 Available grouping of seasonally adjusted indices

The seasonally adjusted indices for 15 groupings shown below are calculated for Japan and Ku-area of Tokyo.

(1) Fixed-base method

< Basic classification index >
- All items
- All items, less fresh food
- All items, less imputed rent
- All items, less imputed rent & fresh food
- All items, less fresh food and energy
- All items, less food (less alcoholic beverages) and energy

< Goods and services group index >
- Goods
- Semi-durable goods
- Goods, less fresh food

(2) CPI calculated by Laspeyres' Chain Index method (Reference index) (For Japan only)

< Basic classification index >
- All items
- All items, less fresh food
- All items, less imputed rent
- All items, less imputed rent & fresh food
- All items, less fresh food and energy
- All items, less food (less alcoholic beverages) and energy

[Reference] Method of seasonal adjustment

There are two methods for seasonal adjustment. One is the method which adjusts indices by each group as All items, 10 major group and subgroups (individual method), and the other is the method which calculates seasonally adjusted indices by item, and upper level seasonally adjusted indices by averaging indices by item by each weight (implicit method).

Some CPI items which show stepwise movements, such as school fees subject to price fluctuation every April, are not applicable to the seasonal adjustment model. Therefore, individual method is applied to group indices (e.g. all items) as a seasonal adjustment method.