

Chapter 7 Seasonal adjustment

1 Seasonal variation and seasonal adjustment

Price fluctuation is partially affected by specific seasonal price movement⁴⁸ (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. Since the change from the year-ago month can be easily calculated, the effects of seasonal variation are often eliminated from the CPI by the change from the year-ago month. However, it should be noted that the change in price movements from the year-ago month includes price movements one year ago in addition to current price movements.

An alternative way is to estimate seasonal variation and remove it from the index (seasonally adjusted index). As seasonally adjusted indices can be compared with those of the previous month, the latest price fluctuations can be determined.

There are various ways to estimate seasonal variation, and the 2020-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 6 Details of seasonal adjustment with X-12-ARIMA” for the specification file set by X-12-ARIMA.

3 Data used to calculate seasonally adjusted indices

The indices after January 2010 are used for original series of seasonally adjusted indices.⁴⁹ However, for the original series from January 2010 to December 2019, the linked indices calculated in “III Chapter 6 Linking of old and new indices” are used.

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 index⁵⁰), 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 are available, all seasonally adjusted indices including these new data are recalculated, and the estimated seasonal indices for the following year are calculated while the seasonally adjusted indices are readjusted retroactively. In this manner, all values after January of the beginning year of 2010 are adjusted by recalculating with new data added every year.

⁴⁸ For example, the price of clothes tends to drop near the change of seasons.

⁴⁹ Indices before rounding fractions are used for the original series.

⁵⁰ 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 8 groupings shown below 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

<Indices calculated by Laspeyres' Chain Index method> (Japan only)

- All items
- All items, less fresh food
- All items, less fresh food 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.