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Statistics Bureau of Japan (SBJ)

Decomposition of Contribution Difference between the new and old bases

The contribution to the year-on-year changes of the All items index of each item is as follows:

$$\frac{I_t \times W \quad - I_{t-1} \times W}{I_{t-1,\mathrm{all}} \times W_{\mathrm{all}}} \times 100 = \left(\frac{I_t \quad - I_{t-1}}{I_{t-1}} \times 100\right) \times \left(\frac{I_{t-1}}{I_{t-1,\mathrm{all}}}\right) \times \left(\frac{W}{W_{\mathrm{all}}}\right) = c_t \quad \times i_{t-1} \times w$$

$(I: index、\ W: weight、\ c: year\ on\ year\ \%\ changes、\ i: index\ ratio、\ w: weight\ ratio)$

From this formula, the formula for obtaining the difference of contribution between the new and old bases can be decomposed as follows.

$$c_t^N i_{t-1}^N w^N - c_t^O i_{t-1}^O w^O = \frac{(i_{t-1}^O c_t^N + i_{t-1}^N c_t^O)}{2}\left(w^N - w^O\right) + \frac{(c_t^N w^O + c_t^O w^N)}{2}(i_{t-1}^N - i_{t-1}^O)$$

$$+ \frac{\left(w^O i_{t-1}^N + w^N i_{t-1}^O\right)}{2}(c_t^N - c_t^O) + (c_t^N - c_t^O)(i_{t-1}^N - i_{t-1}^O)\left(w^N - w^O\right)$$

$(N: new\ base、\ O: old\ base)$

- First term indicates the ‘impact of weight change’.
- Second term indicates the ‘impact of index reset’.
- Third term indicates the ’impact of revision for calculation models’, including the impact of revision of weights on inner-item, changes of item indices for Japan derived from the update of regional integrating weights, and so on.
- Fourth term indicates the ‘impact of add/remove items’.

Decomposition of Contribution differences of ‘Telephone charges (mobile phone)’ for Japan in June 2021 is as follows.

	Contribution		Weight ratio		Ratio of index of the same month in the previous year		Year-on-year % changes
2020-base	-1.04	=	271/10000	×	99.5/99.9	×	-38.5
2015-base	-0.54	=	230/10000	×	84.9/101.7	×	-27.9
	↓		Impact of weight change		Impact of index reset		Impact of revision for calculation models
contribution difference between new and old base	-0.50	=	-0.12	+	-0.13	+	-0.24

Decomposition of Contribution differences of the All items index is as follow. This is obtained by summing up by each 'impact' of each item after its decomposing of contribution differences.

	Contribution difference between new and old base	Impact of weight change	Impact of index reset	Impact of revision for calculation models	impact of add/remove items
All items	-0.64	-0.20	-0.19	-0.24	-0.01