# 2 Chained Index

- In order to analyze effects of changing consumption pattern on the CPI, a chained Laspeyres index; a year-to-year chaining of Laspeyres index based on the preceding year is compiled for reference. Changing consumption pattern is not large since the difference between the official CPI and the chained index is only 0.3 in 2004 based on the 2000 bases.
- Even so, to meet requests for a month-to-month chaining index, methodologies to chain indices monthly with yearly weights are now under consideration.

# Chained Index Formulas

Year $y$ Month $m$ Item $i$ Number of items in the category $n$

Share of Weight $s_{i,y}$ Official Laspeyres Index $I^{L}_{y,m}$ $I^{L}_{y} = \frac{1}{12}\sum_{m=1}^{12} I^{L}_{y,m}$

Month to Month Chaining Index with the Index in the Previous Month

$$I^{Mon-Mon}_{y,m} = I^{L}_{2000,12} P_{2001,1} \cdots P_{y,m-1} P_{y,m} \qquad P_{y,m} = \sum_{i=1}^{n} s_{i,y-1} \frac{I^{L}_{y,m}}{I^{L}_{y,m-1}} \qquad (m \neq 1)$$

$$I^{Mon-Mon}_{y,1} = I^{L}_{2000,12} P_{2001,1} \cdots P_{y-1,12} P_{y,1} \qquad P_{y,1} = \sum_{i=1}^{n} s_{i,y-1} \frac{I^{L}_{y,1}}{I^{L}_{y-1,12}}$$

Month to Month Chaining Index with the Index in the Previous December

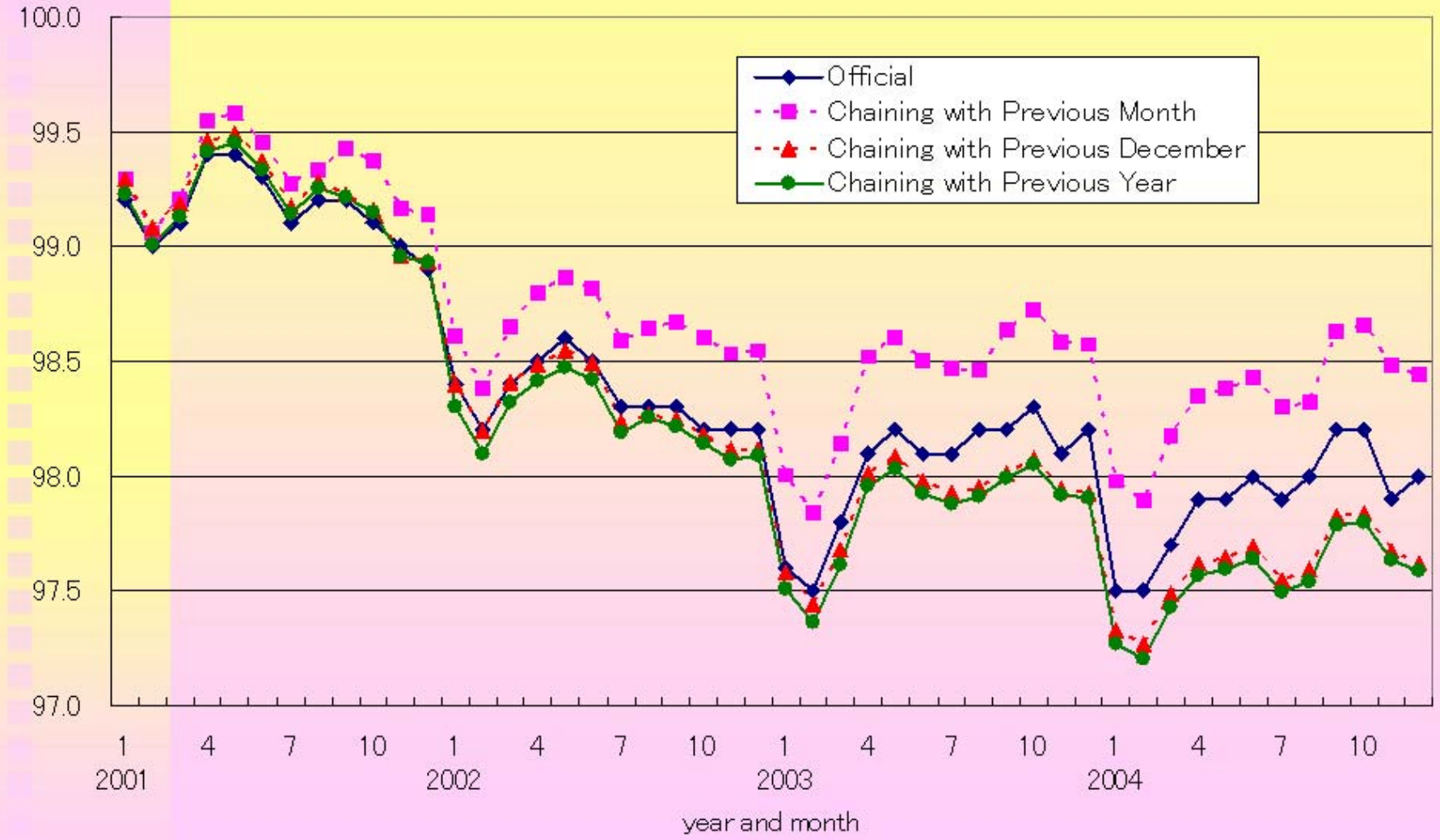
$$I^{Dec-Mon}_{y,m} = I^{L}_{2000,12} P_{2001,12} \cdots P_{y-1,12} P_{y,m} \qquad P_{y,m} = \sum_{i=1}^{n} s_{i,y-1} \frac{I^{L}_{y,m}}{I^{L}_{y-1,12}}$$

Month to Month Chaining Index with the Averaged Index in the Previous Year

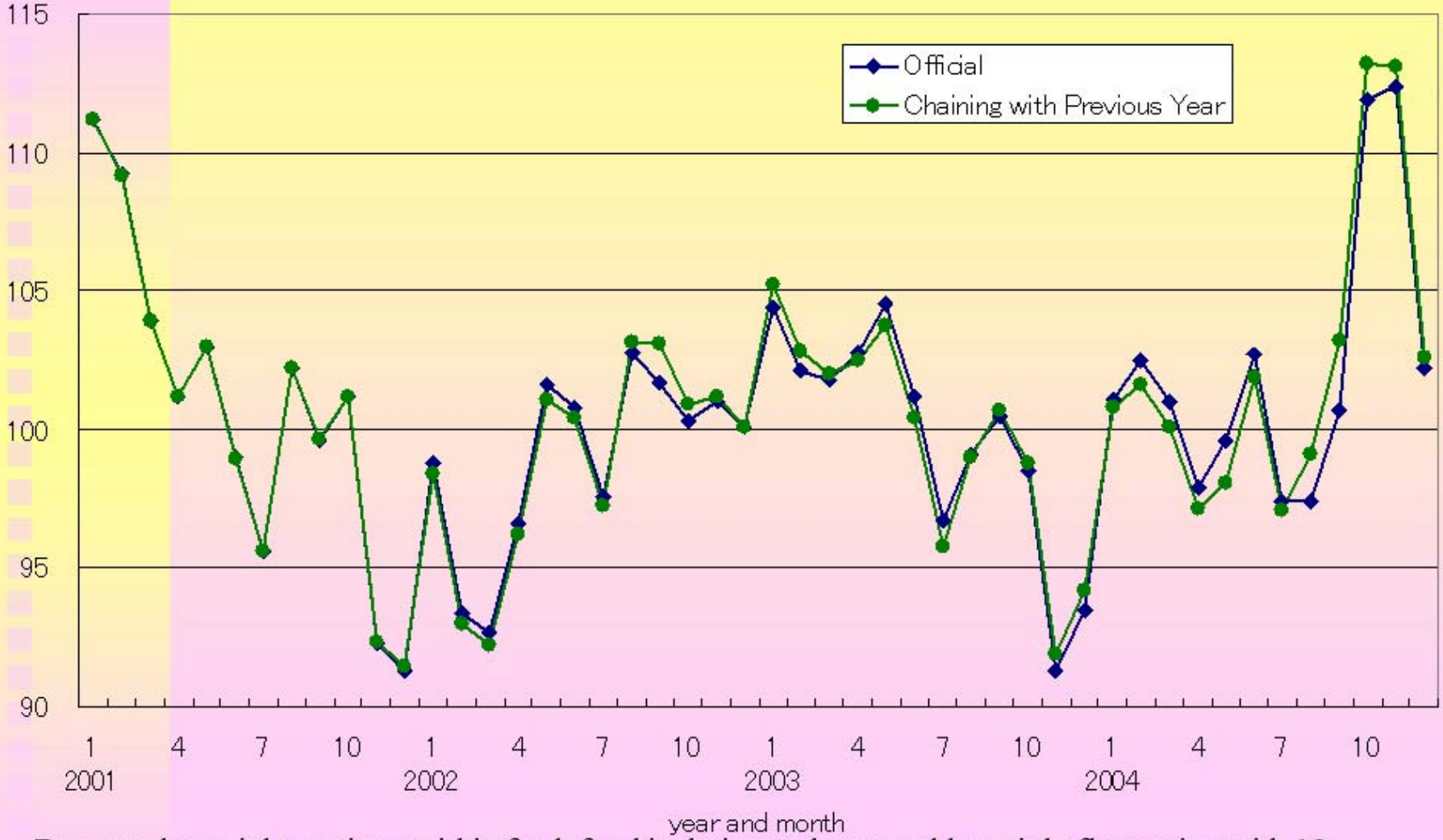
$$I^{Yea-Mon}_{y,m} = I^{L}_{2000} P_{2001} \cdots P_{y-1} P_{y,m} \qquad P_{y} = \sum_{i=1}^{n} s_{i,y-1} \frac{I^{L}_{y}}{I^{L}_{y-1}}$$

$$P_{y,m} = \sum_{i=1}^{n} s_{i,y-1} \frac{I^{L}_{y,m}}{I^{L}_{y-1}}$$

# Figure 2-1 Chained Indexes for General Excluding Fresh Food



# Figure 2-2 Chained Index for Fresh Food




Because the weight per item within fresh food is designated as monthly weight fluctuating with 12 months' cycle including zero weight in some months according to its seasonal consumption pattern, chaining indexes with a index in a specific month cannot be calculated through usual methodology.