

A numerical example of cost of living index

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1. In period B

- Let
$$I = 8$$
$$P_C = 1 \text{ and } P_F = 1$$
- The relative price is
$$P_F/P_C = 1/1 = 1$$
- Assume that the consumer consumes at
$$(F^*, C^*) = (5, 3)$$

2. In period T

- Let
 P_F changes to $P_F' = 4$
- The new relative price is
 $P_F / P_C = 4/1 = 4$
- Assume that with the new relative price, but at original IC, the consumer consumes at
 $(F^*, C^*) = (3, 8)$

3. L_p Vs True cost-of-living index

- Calculate the Laspeyres price index
 $(4 \cdot 5 + 1 \cdot 3) / (1 \cdot 5 + 1 \cdot 3) = 23/8$
- Calculate the True cost-of-living index
 $(4 \cdot 3 + 1 \cdot 8) / (1 \cdot 5 + 1 \cdot 3) = 20/8$

L_p over-estimate true cost-of-living!