

(Box 3) Recent Rise in Upward Pressure of Costs on Prices

The *cost-push indicator*, which measures the upward pressure on prices stemming from the cost increase, shows that such upward pressure has been increasing lately, despite developments in the CPI (all items less fresh food and energy) remaining relatively weak.

The cost-push indicator has been estimated to quantitatively gauge the upward pressure of costs that have not been passed on to prices yet. The indicator will be 0 percent if firms set sales prices at the level that is in line with input costs based on the historically standard relationship between them, while it will be a positive figure if costs are not fully passed on to prices.

To compute the cost-push indicator, the input cost indicators that are deemed most important -- such as the producer price index (PPI), import prices, and wages -- are chosen for each CPI item. Then, the weighted average of residuals that are obtained by regressing each CPI item on the corresponding cost indicator is calculated using the weights of the CPI (Chart B3-1).³⁵

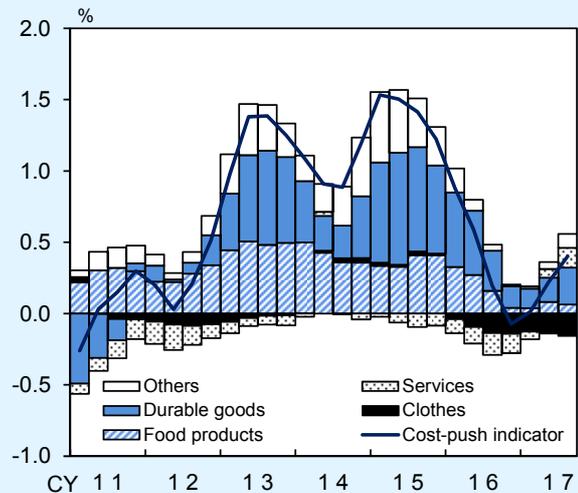
Chart B3-1: Methodology for Estimating the Cost-Push Indicator

For each item comprising the CPI, a corresponding cost indicator is assigned. About 200 items are covered.

Examples:
 CPI canned fish --- Producer Price Index canned seafood
 CPI TV sets --- Import Price Index television receivers
 CPI laundry charges --- Hourly scheduled cash earnings (part-time employees)

The cost-push indicator is defined as the weighted average of residuals obtained by regressing each CPI item on the corresponding cost indicator. The weights are based on the CPI. In the following analyses, the six-month moving average is applied to the indicator in order to smooth out the fluctuations.

Chart B3-2: Cost-Push Indicator



Sources: Ministry of Internal Affairs and Communications, etc.
 Note: Figures for 2017/Q3 are July-August averages.

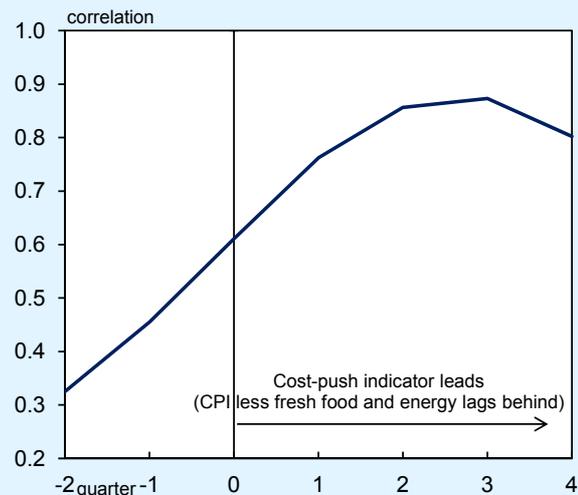
³⁵ For some CPI items, it is difficult to grasp the trend of all costs by a single input cost indicator. Thus, for some items, as a simplistic method to address the issue in computing the cost-push indicator, residuals are calculated by controlling the linear trend. The items for which long-term time-series data are not available or of which signs of parameters do not turn out to be an expected one as a result of regression are excluded when calculating the weighted average.

Looking at the developments in the cost-push indicator, after marking high levels in early 2015, the indicator entered a declining trend; however, it has been rising since the turn of the year with the exception of for clothes (Chart B3-2).

Although the cost-push indicator covers only about 200 items out of the CPI (all items less fresh food and energy), which consists of around 520 items, the two indicators are highly correlated; the cost-push indicator leads the CPI by around two to three quarters (Chart B3-3). Chart B3-4 is a scatter diagram showing a positive correlation between the cost-push indicator of a six-month lead and the annual CPI inflation (all items less fresh food and energy).

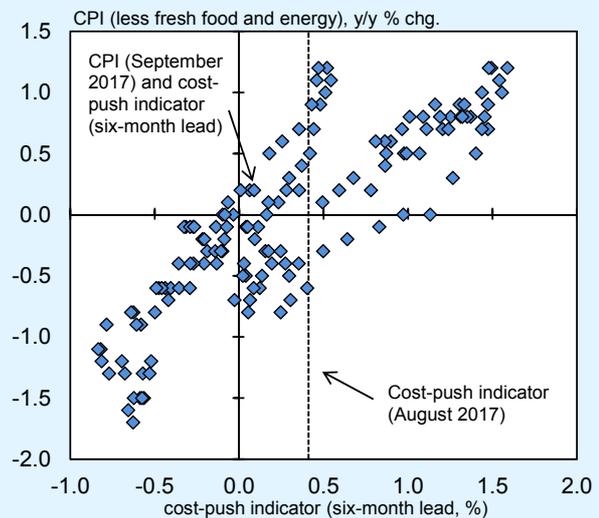
This approach complements the idea of the Phillips curve, which shows the relationship between the output gap and the CPI. As the cost-push indicator rises amid a steady improvement in the output gap, firms' stance is likely to gradually shift toward raising prices.

Chart B3-3: Cross Correlation with the CPI



Sources: Ministry of Internal Affairs and Communications, etc.
 Notes: 1. The calculation period is 2006/Q1-2017/Q2.
 2. The CPI figures are adjusted for changes in the consumption tax rate.

Chart B3-4: Cost-Push Indicator and CPI



Sources: Ministry of Internal Affairs and Communications, etc.
 Notes: 1. Sample period is from January 2006 to September 2017.
 2. The CPI figures are adjusted for changes in the consumption tax rate.