

**(Box 3) Update: Frequency Spectrum Analysis of Private Consumption**

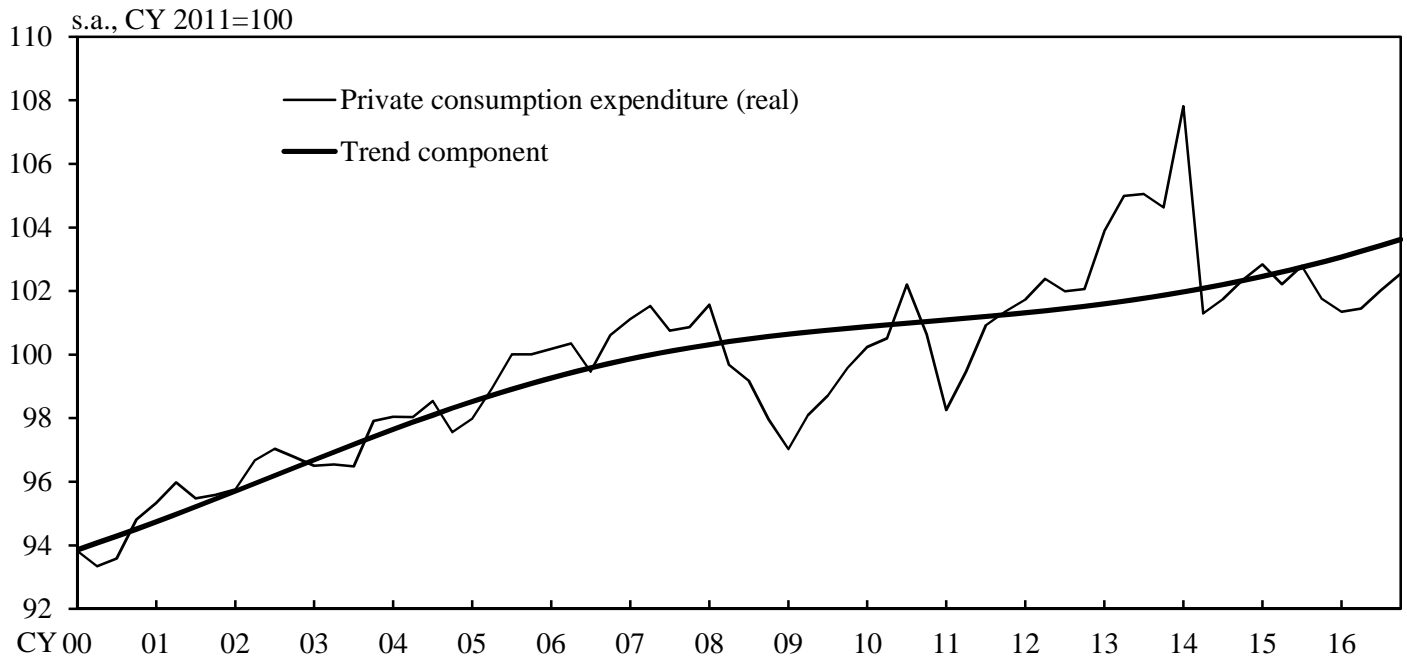
Based on the methodology of a frequency spectrum analysis presented in Box 3 in the July 2016 Outlook Report, private consumption is decomposed into cyclical components that have various frequencies. Specifically, private consumption excluding imputed house rent has been decomposed into the following four components: (1) a short-term cycle of less than 2 years; (2) a medium-term cycle of 2-7 years; (3) a long-term cycle of 7-12 years; and (4) a residual, or a trend component, calculated by subtracting these cycle components from the original data.

The economic interpretation of each cycle is as follows. A short-term cycle captures changes that are brought about by temporary fluctuations stemming from a front-loaded increase and subsequent decline in demand prior to and after the consumption tax hikes, as well as by short-term factors such as weather conditions and the wealth effects due to stock price movements. In a medium-term cycle, the underlying developments in consumption that reflect real employee income and a stock cycle of digital appliances for which the average period of use is about 5 years will likely be included. On the other hand, a long-term cycle is influenced mainly by a stock cycle of durable goods, such as automobiles and white goods, for which the average period of use is relatively long.

The results of analysis suggest that the current improvement in private consumption is supported mainly by a push-up in the short-term cycle (Box Chart 6). The short-term cycle had been negative on a quarter-on-quarter basis from end-2015 to early 2016, reflecting irregular weather (i.e., the unusually warm winter) and the negative wealth effects due to a fall in stock prices; since mid-2016, the cycle has been positive backed by the dissipation of the effects of irregular weather and the rise in stock prices. Meanwhile, the medium-term cycle has continued to be slightly positive recently on a quarter-on-quarter basis in reflection of a steady improvement in real employee income.

## Frequency Spectrum Analysis of Private Consumption

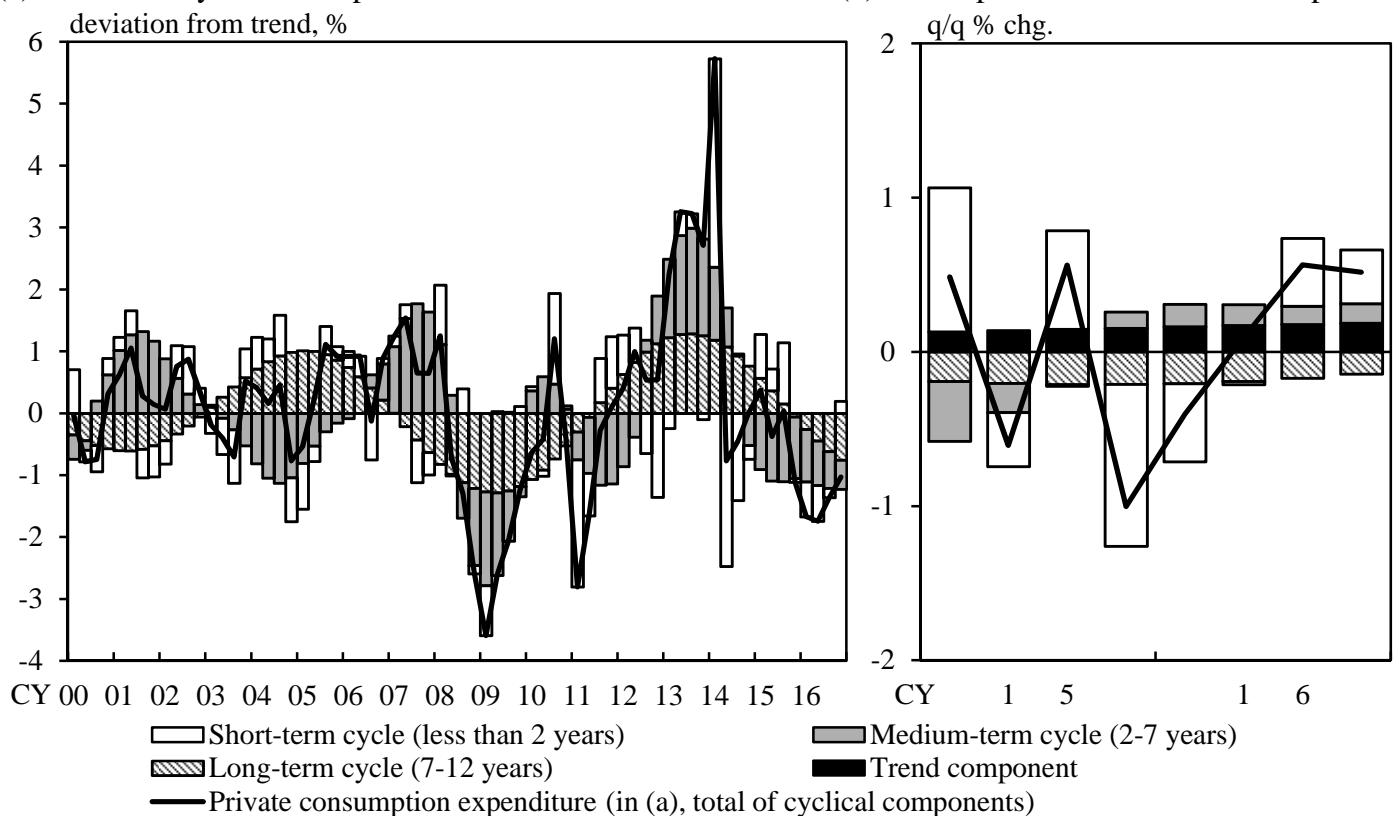
### (1) Private Consumption Expenditure and Its Trend



### (2) Cyclical Components of Private Consumption Expenditure

#### (a) Estimated Cyclical Components

#### (b) Decomposition of Recent Developments



Notes: 1. Up to 2015/Q4, private consumption expenditure is consumption of households (excluding imputed rent) from the SNA (first annual revision). Data from 2016/Q1 are obtained by extending private consumption expenditure using the quarter-on-quarter rate of change in the Consumption Activity Index (adjusting travel balance). Figures for 2016/Q4 are October-November averages.

2. Cyclical components are extracted using the Christiano-Fitzgerald filter. The trend component is calculated by subtracting cyclical components from the original series. The estimation period for filtering is 1980/Q1-2016/Q4.

Sources: Cabinet Office; Bank of Japan; Ministry of Economy, Trade and Industry; Ministry of Internal Affairs and Communications, etc.