

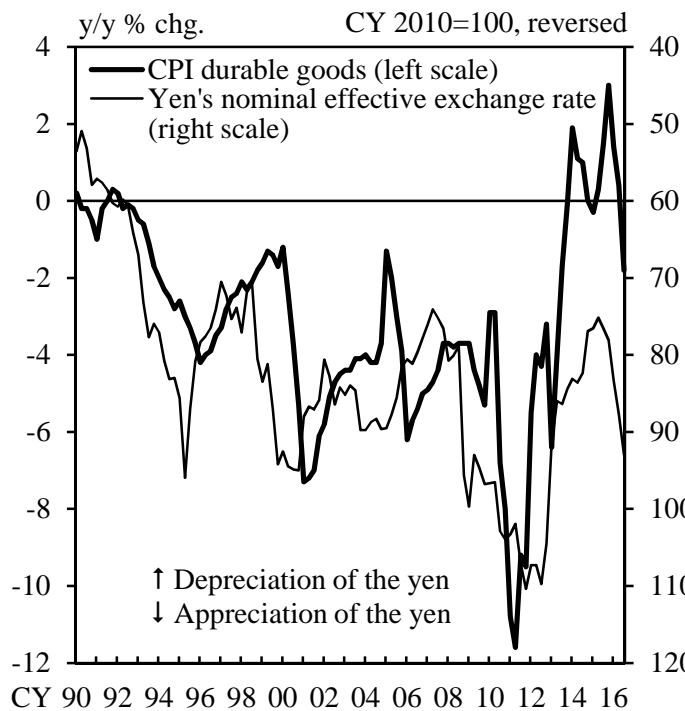
(Box 4) Exchange Rates and Prices of Durable Goods

Prices for durable goods in the CPI have turned to a decline recently, and this is considered to be largely attributable to the appreciation of the yen since the middle of 2015 (Box Chart 4 [1] and [2]). In particular, household electrical appliances, mainly white goods, are hardly successful in product differentiation in recent years, due to inactive technological innovation, and thus are subject to fierce competition from the products made in emerging economies. Furthermore, the import penetration ratio has increased significantly on the back of the shift to overseas production sites resulting from the sharp appreciation of the yen since the global financial crisis (Box Chart 4 [3] and [4]). As a result, household electrical appliances seem to be subject to a rise in pass-through of exchange-rate changes to their prices in recent years. In fact, in the yen's depreciation phases, which occurred twice since the introduction of QQE, a clear rise in prices for household electrical appliances was observed, whereas in the yen's appreciation phase since the latter half of 2015, the prices have been on a declining trend.

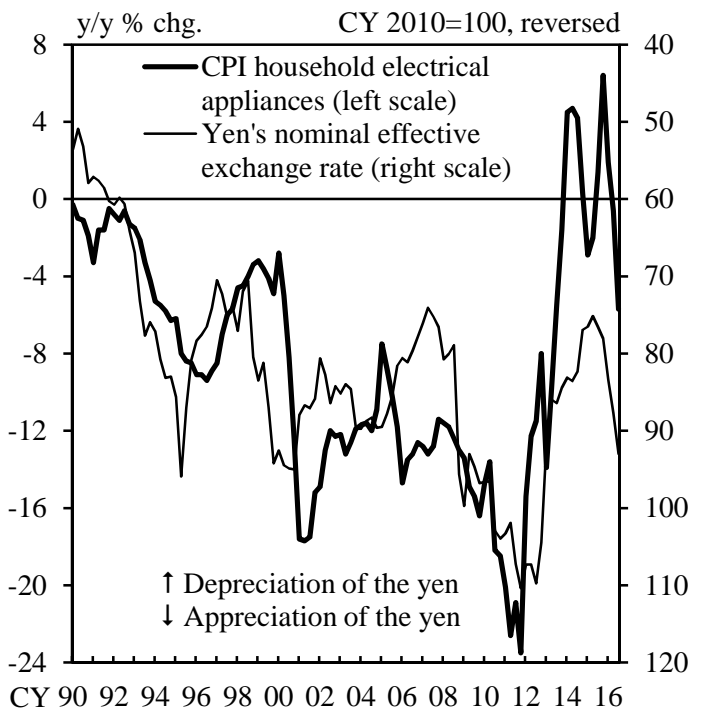
In order to empirically confirm the points above, a simple VAR model was estimated, consisting of the four variables of (1) crude oil prices, (2) exchange rates, (3) the output gap, and (4) the CPI. An assessment was made on how the effects of exchange rates on the CPI have changed in recent years. The time series developments of the responses of the CPI to exchange rate shocks show that the effects of exchange rates on the CPI -- for example, the rise in pass-through ratio -- have become clearer in recent years, and this tendency is particularly evident for durable goods (Box Chart 5).

Exchange Rates and Consumer Durable Goods Prices

(1) Consumer Durable Goods Prices and Exchange Rates



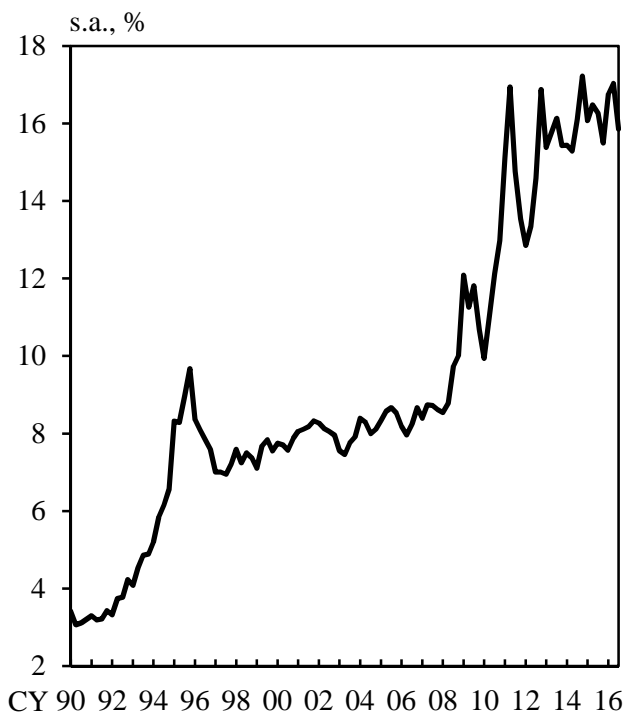
(2) Household Electrical Appliances Prices and Exchange Rates



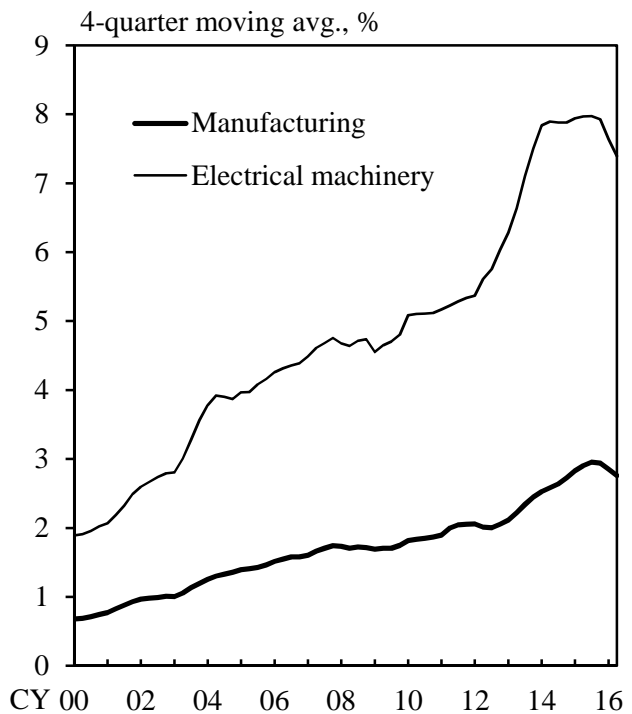
Notes: 1. Household electrical appliances consist of durable goods assisting housework, heating & cooling appliances and recreational durable goods (less pianos and desks).

2. Figures for the CPI are adjusted to exclude the estimated effects of changes in the consumption tax rate.

(3) Import Penetration of Consumer Durable Goods



(4) Overseas Production Ratio (for Sales to Japan)



Notes: 1. The import penetration ratio is based on "the Indices of Industrial Domestic Shipments and Imports (2010 base)."

Import penetration ratio = imports / domestic shipments and imports

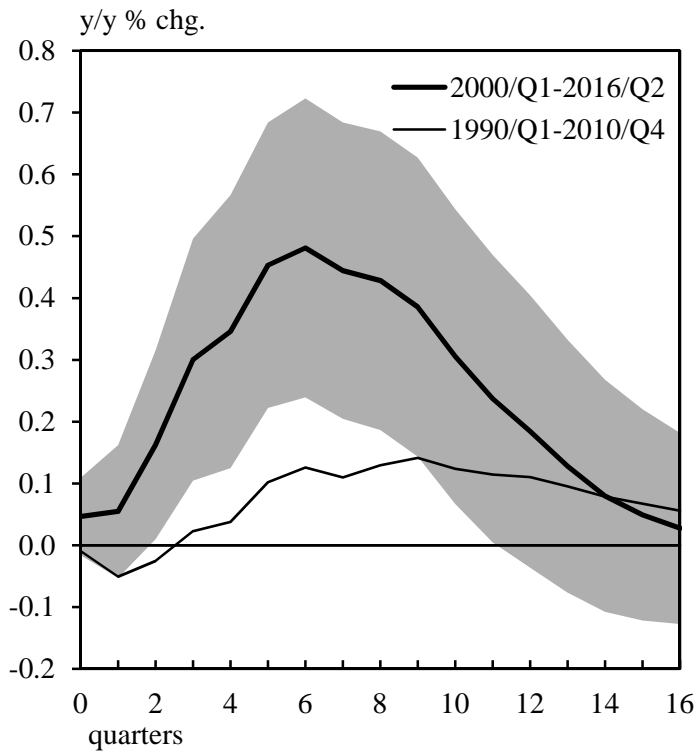
The figure for the import penetration ratio for 2016/Q3 is the July-August average.

2. Overseas production ratio = sales to Japan of overseas subsidiaries / (sales to Japan of overseas subsidiaries + sales of domestic companies)

Sources: Ministry of Internal Affairs and Communications; Ministry of Economy, Trade and Industry; Ministry of Finance; BIS.

Effects of Exchange Rates on the CPI

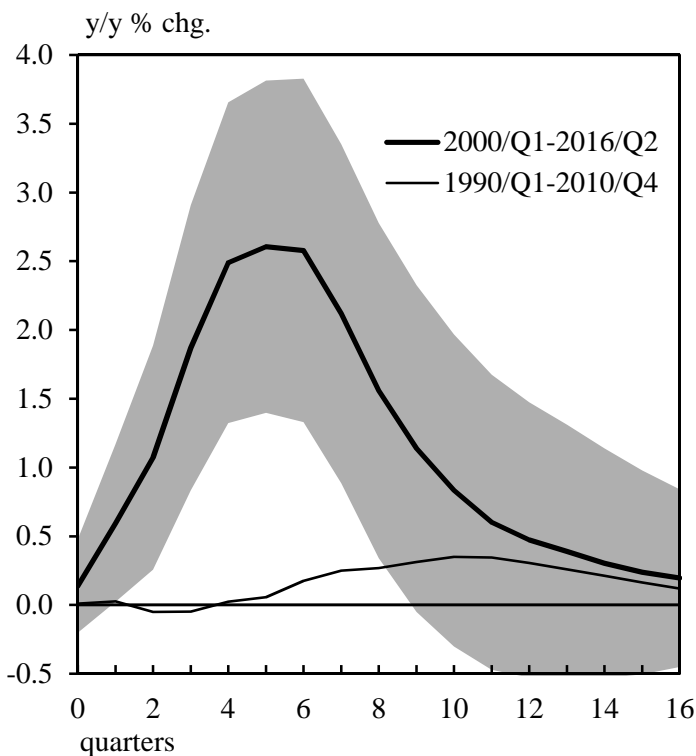
(1) Responses of the CPI (Less Fresh Food and Energy) to a 10-Percent Yen Depreciation Shock



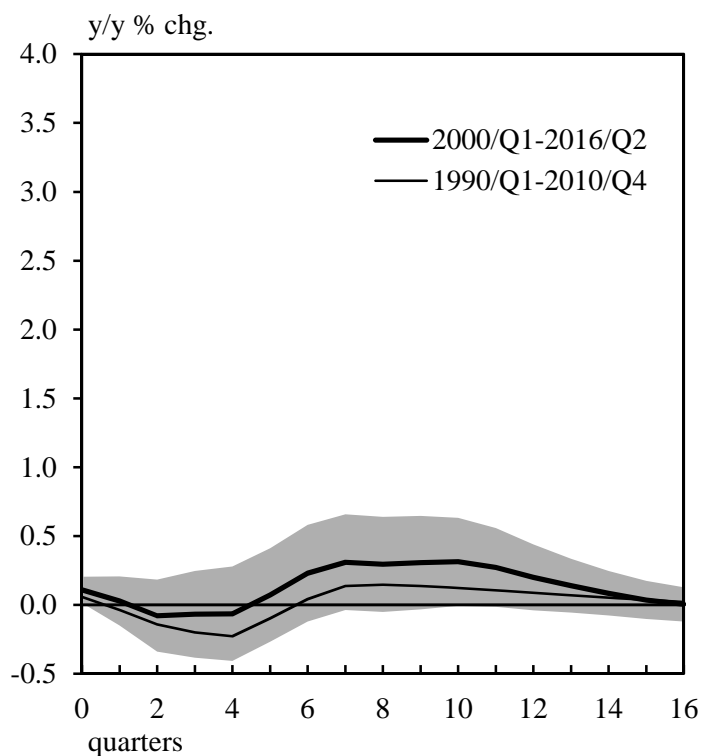
(Estimation Model: 4-Variable VAR)
 1. Real crude oil prices
 2. Yen's nominal effective exchange rates
 3. Output gap
 4. CPI
 -- CPI (less fresh food and energy) is used for the estimation in (1). The disaggregated data (durable goods and other goods) are used for the estimations in (2).
 Estimation periods: 1990/Q1-2010/Q4
 2000/Q1-2016/Q2
 Except for the output gap, variables in the estimations are quarter-on-quarter changes. Shock identification is based on Cholesky decomposition in the above order.

(2) Responses of Goods (Less Fresh Food and Energy) to a 10-Percent Yen Depreciation Shock

(a) Consumer Durable Goods



(b) Consumer Goods Excluding Durable Goods



Notes: 1. Figures for the CPI (less fresh food and energy) are calculated by the Research and Statistics Department, Bank of Japan.
 2. Figures for the CPI are adjusted to exclude the estimated effects of changes in the consumption tax rate.
 3. Real crude oil prices are obtained by deflating nominal WTI crude oil prices by the U.S. CPI (all items).
 4. Shaded areas indicate 75 percentile bands.

Sources: Ministry of Internal Affairs and Communications; Cabinet Office; BIS, etc.