

(Box 2) Decomposition of the Recent Decline in Real Exports

This box examines the background behind Japan's exports having shown some weakness recently by using data for real exports by destination and goods. Specifically, based on a certain estimation method, real export developments were decomposed into (1) factors specific to each destination, (2) factors specific to each type of goods, and (3) factors common to all destinations and goods (Chart B2-1).³⁹

Looking at destination-specific factors of late, factors specific to the United States and the EU have made a positive contribution to real exports, while those specific to Asia, mainly China, have made a relatively large negative contribution (Chart B2-2). In terms of goods-specific factors, motor vehicles and related goods have contributed to pushing up real exports, whereas IT-related goods and capital goods, such as parts for smartphones and semiconductor production equipment, have contributed to pushing them down (Chart B2-3). Reexamining factors affecting real export developments in view of these results, the decline in exports in the January-March quarter of 2019 can be explained almost entirely by the negative contribution of "factors specific to Asia" and "factors specific to IT-related goods and capital goods" (Chart B2-4).

Chart B2-1: Decomposition into Factors Affecting Export Developments

Using panel data for quarter-on-quarter changes in real exports by destination and goods, the following regression equation is estimated:

(Estimation model)

$$\begin{aligned}
 d\ln(\text{REX}_{c,i}(t)) = & \sum_{b=2}^{N_d} \sum_{s=1}^T \alpha_{b,s,i} \times I_{b,s,i}(t) \quad \dots \text{Factors specific to destination } c \\
 & + \sum_{h=2}^{N_g} \sum_{s=1}^T \beta_{c,s,h} \times I_{c,s,h}(t) \quad \dots \text{Factors specific to goods } i \\
 & + \sum_{s=1}^T \gamma_s \times I_s(t) \quad \dots \text{Common factors} \\
 & + \varepsilon_{c,i}(t)
 \end{aligned}$$

(Variables)

$\text{REX}_{c,i}(t)$ = Real exports of goods i to destination c at time t

$$I_{b,s,i}(t) = \begin{cases} 1/N_g & \text{if } b = c \text{ \& } s = t \\ -1/(N_g \times (N_d - 1)) & \text{if } b \neq c \text{ \& } s = t \\ 0 & \text{if otherwise} \end{cases}$$

$$I_{c,s,h}(t) = \begin{cases} 1/N_d & \text{if } h = i \text{ \& } s = t \\ -1/(N_d \times (N_g - 1)) & \text{if } h \neq i \text{ \& } s = t \\ 0 & \text{if otherwise} \end{cases}$$

$$I_s(t) = \begin{cases} 1 & \text{if } s = t \\ 0 & \text{if otherwise} \end{cases}$$

c = "United States," "EU," "China," "NIEs, ASEAN, etc.," and "other economies"

i = "Intermediate goods," "motor vehicles and related goods," "IT-related goods," "capital goods," and "other goods"

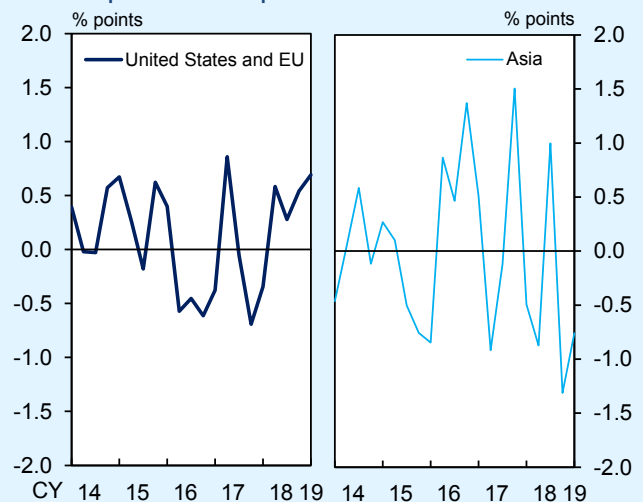
N_d = Number of destinations N_g = Number of goods

(Estimation period)

2000/Q1-2019/Q1

where $s = 1$ and $s = T$ correspond to 2000/Q1 and 2019/Q1, respectively.

Chart B2-2: Destination-Specific Factors in Export Developments



Sources: Bank of Japan; Ministry of Finance.

Notes: 1. Figures show the contribution to changes in real exports on a seasonally adjusted quarter-on-quarter basis.

2. "Asia" consists of "China" and "NIEs, ASEAN, etc."

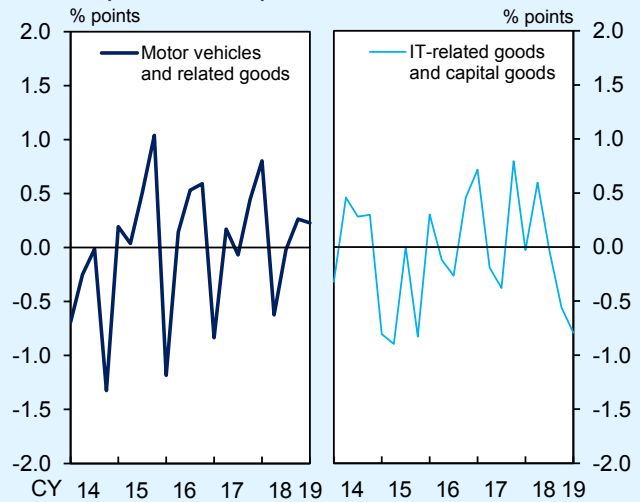
3. Based on staff calculations.

³⁹ For details on the estimation method, see "Nihon no seisan hendō: Gurōbaru kin'yū shokku to sekai keizai no kōzō henka" [Changes in Japan's production: Global financial shocks and structural changes in the global economy], Bank of Japan Review Series (2010-J-05) (available only in Japanese).

"Factors specific to Asia" and "factors specific to IT-related goods and capital goods" have made a negative contribution to overall exports since the October-December quarter of 2018. However, real exports as a whole did not decrease in the October-December quarter because "other factors," which fell substantially in the July-September quarter, made a positive contribution in that quarter. These developments in "other factors" are likely to have been strongly affected by last summer's natural disasters and the subsequent restoration.

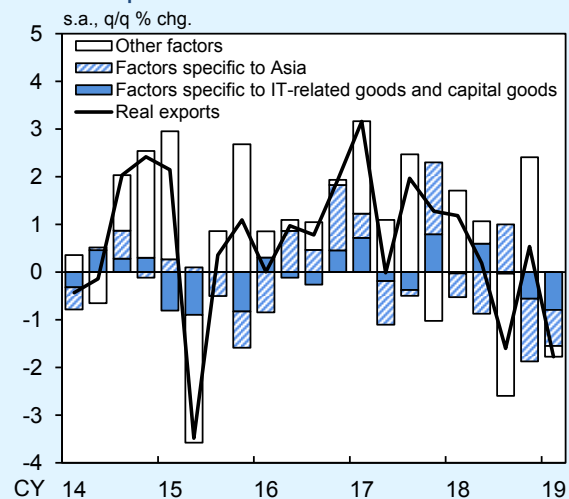
The above analysis suggests the following. (1) The impact of developments in the Chinese economy and the global cycle for IT-related goods lies behind the recent decline in real exports. (2) Although these factors have pushed down real exports since the October-December quarter of last year, their impact was difficult to identify due to the effects of restoration from natural disasters. (3) With the effects of the restoration waning since the turn of the year, the impact of these factors has materialized in the form of a decline in real exports.

Chart B2-3: Goods-Specific Factors in Export Developments



Sources: Bank of Japan; Ministry of Finance.
 Notes: 1. Figures show the contribution to changes in real exports on a seasonally adjusted quarter-on-quarter basis.
 2. Based on staff calculations.

Chart B2-4: Decomposition of Real Export Developments



Sources: Bank of Japan; Ministry of Finance.
 Notes: 1. "Asia" consists of "China" and "NIEs, ASEAN, etc." "Other factors" is the residual.
 2. Based on staff calculations.