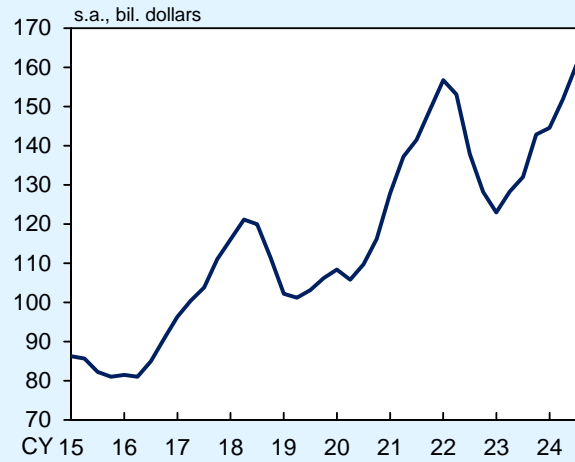


(Box 1) Developments in IT-Related Cycles

Japan's production and exports of IT-related goods (semiconductor production equipment, etc.) are likely to increase on the back of a recovery in global IT-related demand (Chart B1-1). This box analyzes the global cycle for IT-related goods and the sustainability of demand for these goods. The shipments-inventories balance of IT-related goods in Japan, South Korea, and Taiwan has been improving, mainly reflecting progress in inventory adjustments (Chart B1-2).

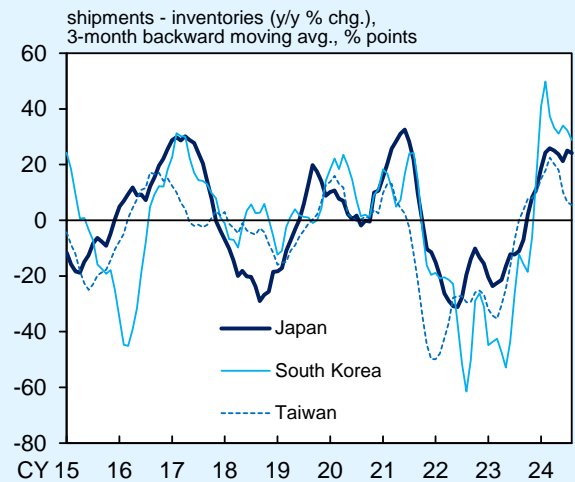
Looking at the IT-related sector in detail, the pace of technological innovation in the sector is generally fast, and semiconductor manufacturers have been competing to produce more semiconductors in order to recover their considerable investment costs. Under these circumstances, the IT-related sector has frequently experienced large-scale boom-bust cycles, such as the IT bubble in the early 2000s. Given these features, by applying frequency spectrum decomposition, the amount of semiconductor shipment is decomposed, using global data and data for Japan, into the following cycles: (1) the short-term cycle (2 quarters to 2 years), (2) the medium-term cycle (2-6 years), and (3) the long-term cycle (6-10 years).²¹ The short-term cycle is considered to reflect the impact of inventory adjustments; the medium-term cycle to reflect developments in business fixed investment, such as by semiconductor manufacturers, owing to the replacement cycle of

Chart B1-1: World Semiconductor Shipments



Note: Based on staff calculations using World Semiconductor Trade Statistics (WSTS) data. The figure for 2024/Q3 is the July-August average.

Chart B1-2: Shipments-Inventories Balance of IT-Related Goods



Sources: CEIC; Ministry of Economy, Trade and Industry. Note: Figures for Japan are the weighted averages of those for "electronic parts and devices" and "information and communication electronics equipment." Figures for South Korea and Taiwan are those for items corresponding to these categories.

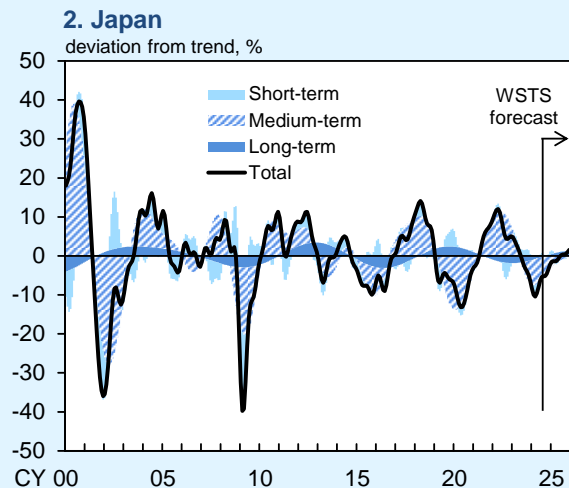
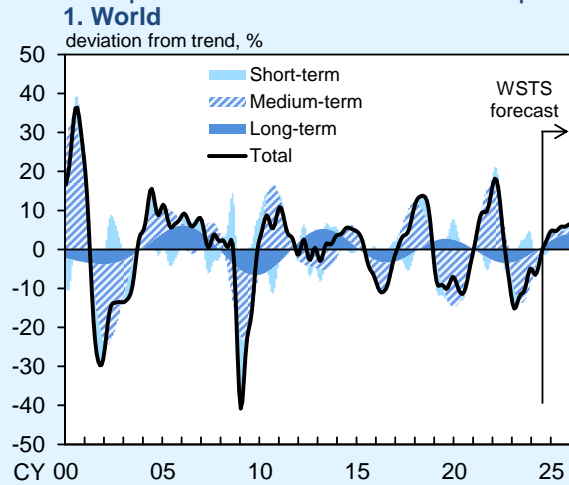
²¹ For the extraction of the global cycle for IT-related goods, see also Box 4 of the April 2019 Outlook Report.

products and IT-related demand; and the long-term cycle to reflect the effects of expansion in the use of semiconductors, such as for AI, on-board equipment for motor vehicles, data centers, and the renewal of IT-related infrastructure.

The estimation results show that medium- and long-term cyclical components of global semiconductor shipments are approaching a turning point in the current phase, reflecting the fact that (1) the replacement cycle seems to be approaching for computers and smartphones, for which demand was boosted during the pandemic, and (2) the use of generative AI has been pushing up demand. The upward momentum led by these factors is expected to remain through around 2026 (Chart B1-3). Similarly, the estimation results for semiconductor shipments in Japan show that demand is expected to recover, albeit at a slower pace and at a lower level of increase in the medium- and long-term cyclical components compared with global medium- and long-term cycles.

In past global cycles for IT-related goods, however, IT booms and busts were induced through multiple orders and excessive investments, as semiconductor manufacturers tend to assume a rise in demand when the cycle for IT-related goods is expected to enter an increasing phase. In the current phase, demand could be weaker than expected, depending on the sustainability of AI-related demand or partly reflecting sluggish demand for items such as computers and smartphones, due to prolonged replacement cycles. In this regard, global

Chart B1-3: Frequency Spectrum Decomposition of Semiconductor Shipments



Notes: 1. Based on staff calculations using WSTS data. The WSTS forecast is as of May 2024.

2. Using the Christiano-Fitzgerald filter, the following cyclical components are extracted from the WSTS data for world semiconductor shipments and Japanese semiconductor shipments (in U.S. dollars, log scale): (a) the short-term cycle (2 quarters to 2 years), (b) the medium-term cycle (2-6 years), and (c) the long-term cycle (6-10 years). The estimation period is from January 1988 to December 2025. The trend is the residual obtained by subtracting (a), (b), and (c) from world semiconductor shipments and Japanese semiconductor shipments, respectively.

semiconductor shipment data is linked to the stock price index of semiconductors (the PHLX Semiconductor Sector) and attention is warranted to the fact that an increase in the stock prices for semiconductors appears to have peaked out recently (Chart B1-4).

Japan's exports are projected to return to an uptrend, mainly due to a recovery in global demand for IT-related goods. However, it is necessary to continue to monitor future developments in global IT-related demand, including developments in individual countries and regions and in different final products, and observe how these developments affect Japan's economy, while taking into account the sustainability of AI-related demand.

Chart B1-4: Global Cycle for IT-Related Goods and Semiconductor Stock Prices

