

(Box 4) Developments in the Global Cycle for IT-Related Goods

The decomposition of real export developments in Box 2 shows that the recent weakness in exports is largely attributable to factors such as the global cycle for IT-related goods. This box analyzes this cycle by using frequency spectrum decomposition.⁴⁰

Specifically, applying frequency spectrum decomposition to world semiconductor shipment data compiled by World Semiconductor Trade Statistics (WSTS) Inc., (1) the short-term cycle (2 quarters to 2 years), (2) the medium-term cycle (2-6 years), and (3) the long-term cycle (6-20 years) were extracted (Chart B4-1). The extracted cycle for IT-related goods indicates that the short-term and medium-term cycles have contributed to the recent decline in semiconductor shipments (Chart B4-2). These cycles likely reflect fluctuations due to the introduction of new products including smartphones, medium-term trends in IT-related demand, and the resultant developments in business fixed investment, such as by semiconductor manufacturers.⁴¹ On the other hand, the long-term cycle has continued to push up semiconductor shipments for the past few years, which likely is attributable to a sustained expansion in the use of semiconductors

⁴⁰ For frequency spectrum decomposition, see the Bank's research paper "Recent Developments in Durable Goods Consumption: A Perspective from Spectrum Analysis" published in March 2017.

⁴¹ The extracted medium-term cycle is highly correlated with the deviation from the trend of Machinery Orders (from overseas) for electronic and communication equipment such as semiconductor production equipment. This is why the medium-term cycle likely reflects business fixed investment cycles, such as of semiconductor manufacturers.

Chart B4-1: Extraction of Global Cycle for IT-Related Goods

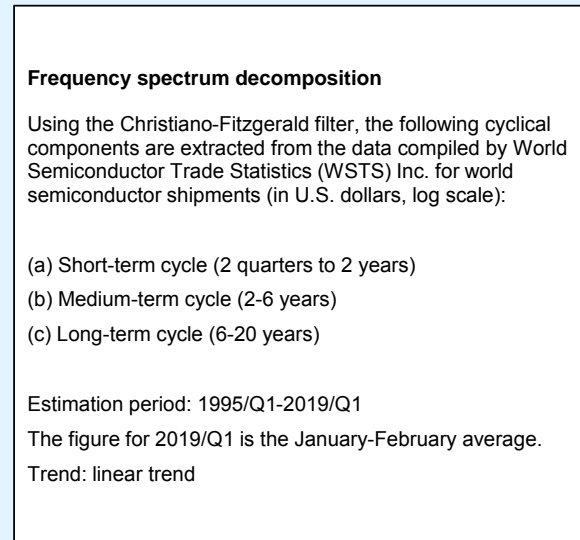
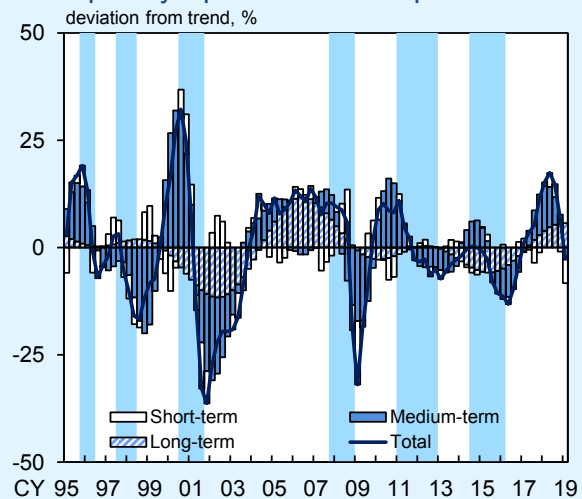


Chart B4-2: Cycles Extracted Using Frequency Spectrum Decomposition

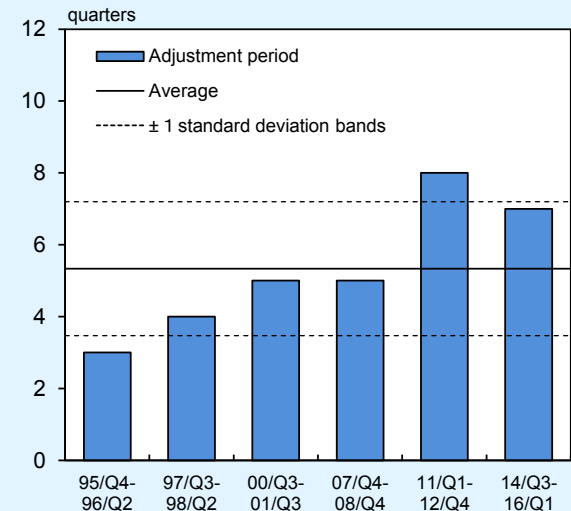


Notes: 1. Shaded areas indicate adjustment periods in the global cycle for IT-related goods. Adjustment periods are defined as periods that (1) include a point where the total of cycles falls below zero and (2) start at the peak point of the total preceding the zero point and end one quarter prior to the subsequent bottom point.
 2. Based on staff calculations using the WSTS data.

in the long term, such as for on-board equipment for motor vehicles and data centers.

Past trends show that adjustments in the cycle for IT-related goods take an average of 5-6 quarters to complete (Chart B4-3). Based on this, the current adjustment phase, which began in the April-June quarter of 2018, may hit bottom in the second half of this year. In interviews of firms as well, some have said that demand mainly in parts for smartphones is expected to recover by that time, and that demand related to the introduction of 5G, which is the next-generation communication standard, is likely to gradually rise.

Chart B4-3: Adjustment Periods in the Global Cycle for IT-Related Goods



Notes: 1. The adjustment periods correspond to the shaded areas in Chart B4-2.
2. Based on staff calculations using the WSTS data.