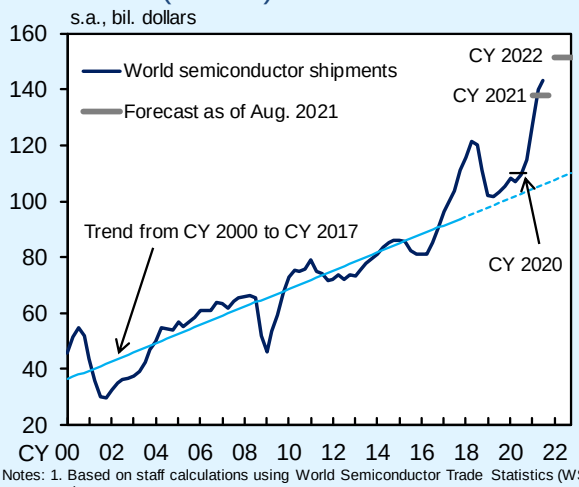
(Box 2) Developments in "Digital-Related Exports"

Japan's real exports of automobile-related goods have decreased due to the effects of supply-side constraints, but those of other goods -- such as IT-related, intermediate, and capital goods -- have continued on an uptrend (Chart 13). Overall exports are likely to remain in the deceleration phase for the time being but are expected to return to a rising path thereafter, supported by a recovery in global demand, with the effects of supply-side constraints waning gradually. The rise in Japan's exports is likely to be driven in particular by a rapid expansion in global demand for digital-related goods, as indicated by forecasts for an increase in demand for semiconductors (Chart B2-1). Regarding the recent supply-side constraints such as on semiconductors, while it should be noted that supply-chain disruptions in the ASEAN countries have been the trigger for the production declines at final product manufacturers, the underlying cause of the constraints is that global demand for digital-related goods, mainly semiconductors, has been expanding firmly at a pace exceeding suppliers' expectations.

Chart B2-1: World Semiconductor Demand (WSTS)



Notes: 1. Based on staff calculations using World Semiconductor Trade Statistics (WSTS) data.
2. The figure for 2021/Q3 is the July-August average.

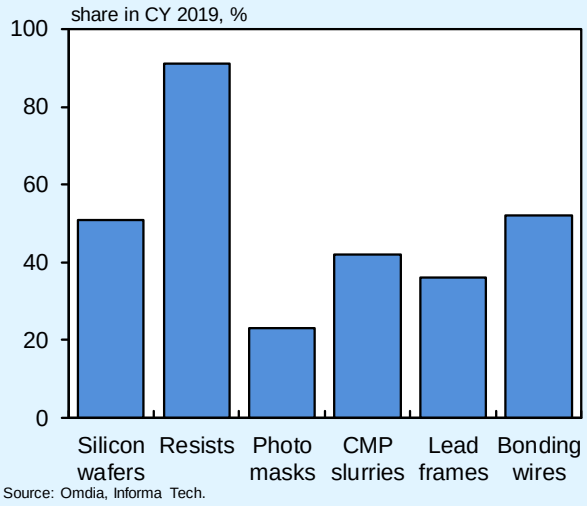
The expansion in demand for digital-related goods is likely to stimulate exports of not only items classified as IT-related goods (e.g., semiconductors and personal computers) in real export data compiled by the Bank but also some items that are classified as either capital goods or intermediate goods and closely related to IT. In this box, "digital-related exports," which is broadly defined to include exports of some of the capital or intermediate goods just described, is

calculated so as to comprehensively capture the positive effects that the uptrend in demand for semiconductors and related goods has on Japan's exports.

A detailed look at real exports by item shows that many goods have a close link with global demand for digital-related goods. Of capital goods, for example, semiconductor production equipment obviously is closely related to demand for semiconductors; exports and production of this equipment have increased clearly of late, reflecting the rapid expansion in demand for semiconductors. In addition, many parts and components classified as intermediate goods in the Bank's real export data have a high correlation with changes in digital-related demand. Typical examples of these parts and components are the so-called cutting-edge materials, such as silicon wafers and plastic films (e.g., LCD protective films and insulating films). Regarding semiconductor production equipment as well as various semiconductor and related materials, Japanese firms have large global market shares in many items where they have advantages in terms of, for example, relevant technologies (Chart B2-2).

Given these observations, as a new indicator to more comprehensively capture the effects of the expansion in demand for digital-related goods on Japan's exports, "digital-related exports" is estimated by adding up exports of (1) IT-related goods, as currently classified by the Bank, (2) semiconductor production equipment included in capital goods, and (3) intermediate goods that have a high correlation with the "silicon cycle"

Chart B2-2: Japanese Firms' Share of the Semiconductor Materials Market



Source: Omdia, Informa Tech.

(Chart B2-3).[23]

The estimated digital-related exports account for over 30 percent of total nominal exports, implying that these correspond to exports of a wider range of goods than those in the existing category of IT-related goods, which account for over 20 percent of total nominal exports (Chart B2-4). Looking at developments in the share of digital-related exports in total nominal exports by goods comprising digital-related goods, the share of IT-related goods fell substantially in the 2000s, mainly reflecting a decline in product prices and the effects of the relocation of production bases to overseas, and has been on a moderate declining trend since then (Chart B2-5). On the other hand, the shares of semiconductor production equipment and digital-related intermediate goods have continued to rise in recent years. As a result, the share of overall digital-related exports in total nominal exports has remained at a high level.

Turning to developments in real terms, since the outbreak of COVID-19, the estimated

Chart B2-3: Overview of Digital-Related Goods

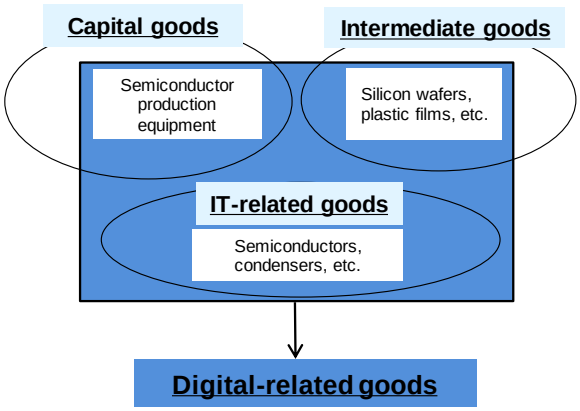
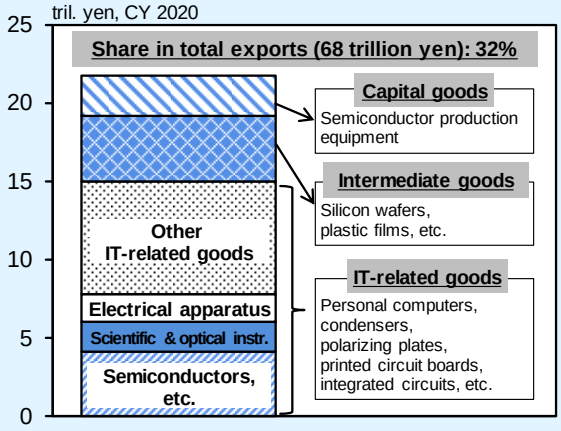
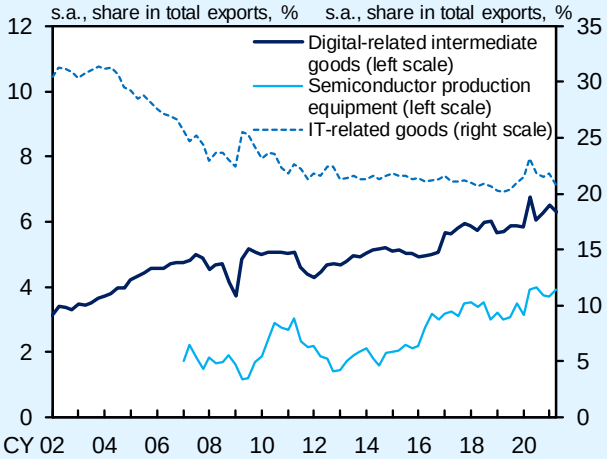


Chart B2-4: Breakdown of Nominal Digital-Related Exports



Sources: Ministry of Finance; WSTS; OECD; Nikkei NEEDS-Financial QUEST.

Chart B2-5: Share of Digital-Related Exports in Total Nominal Exports

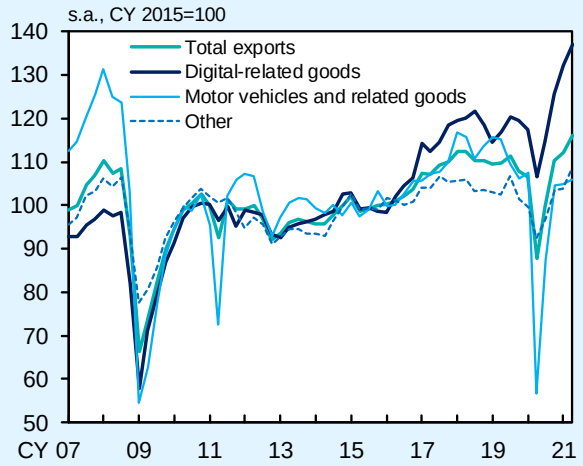


Sources: Ministry of Finance; WSTS; OECD; Nikkei NEEDS-Financial QUEST.
Note: Figures for semiconductor production equipment are available from CY 2007 onward.

[23] Since a variety of items are classified as intermediate goods, it is difficult to identify which are to be used for digital products simply by referring to their name. Therefore, in estimating "digital-related exports," a statistical approach is employed and intermediate goods that are highly correlated with world semiconductor shipments -- calculated using World Semiconductor Trade Statistics (WSTS) data -- are selected as items described in (3) above. More specifically, the selection is made using the following criterion: based on data for the period 2003-2020, an item is selected if the correlation coefficient between its export value and world semiconductor shipments -- both of which are in yen terms and measured on the basis of the year-on-year rate of change -- is 0.5 or higher. Then, the selected items are narrowed down to those having a higher correlation with global semiconductor demand than with the OECD's Composite Leading Indicator (a proxy indicator of the global business cycle), so as to exclude items for which exports increase or decrease in tandem with the typical business cycle.

digital-related exports have increased at a pace exceeding growth in what the Bank currently classifies as IT-related exports, thereby driving a rise in total real exports (Chart B2-6). In sum, the expansion in global demand for digital-related goods recently has been benefitting a wide range of industries in Japan's economy. This expansion is likely to push up Japan's exports as a trend, with the global economy, particularly advanced economies, continuing to recover.

Chart B2-6: Real Digital-Related Exports



Sources: Bank of Japan; Ministry of Finance; WSTS; OECD; Nikkei NEEDS-Financial QUEST.