
Mizuho Economic Outlook & Analysis

September 2, 2019

When will Japan's capital goods exports begin to pick up?

The timing of recovery may be delayed to the latter half of 2020

< Summary >

- ◆ Japan's capital goods exports have remained sluggish since the latter half of 2018 with no sign of bottoming out. The primary factor for this downturn is the declining exports of semiconductor/FDP manufacturing equipment, industrial robots, and machining centers among metal forming machinery.
- ◆ It seems these three items were hit hard by slowing demand in the US and Chinese auto markets as well as the global IT market now in the midst of an adjustment phase. Also, there were negative effects by the trend to curb capital expenditures on the back of heightening uncertainty due to US-China trade friction.
- ◆ According to the statistics of machinery orders, we have not detected any sign of capital goods exports hitting bottom in the latter half of 2019. Although the recovery is expected to begin from mid-2020, the timing may be delayed to the latter half of 2020 if uncertainty rises with US-China trade friction further intensifying, among other factors.

Mizuho Research Institute Ltd.

Rino Onodera, Economic Research Department

rino.onodera@mizuho-ri.co.jp

Takayuki Miyajima, Senior Economist, Economic Research Department

takayuki.miyajima@mizuho-ri.co.jp

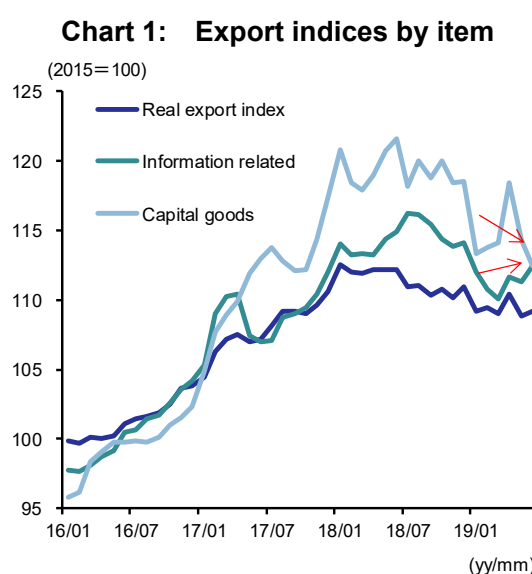
This publication is compiled solely for the purpose of providing readers with information on a free-of-charge basis and is in no way meant to solicit transactions. Although this publication is compiled on the basis of sources which we believe to be reliable and correct, Mizuho Research Institute does not warrant its accuracy and certainty. Readers are requested to exercise their own judgment in the use of this publication. Please also note that the contents of this publication may be subject to change without prior notice. In the event readers do not wish to receive information free of charge from Mizuho Research Institute, readers are requested to notify their wish to suspend subscription.

1. Japan's export of goods continues to weaken. When will the export of capital goods, a key item in all goods, start picking up?

No sign of bottoming out has yet to emerge for Japan's exports. As Sakamoto et al. (2018) pointed out, Japan's export of goods was on a growth track from 2017 to the early half of 2018. At that time, global investment demand was reviving fueled by the recovery of the world economy, and capital goods such as industrial robots were a driving force behind export growth. But in mid-2018, the export of goods, particularly capital goods, peaked out, and we have not detected any sign of recovery over the past year since then. The trend of export is rather sluggish. As Sakamoto (2018) stated, the decline in export of goods from July to September 2018 was attributable to various natural disasters, such as Typhoon Jebi (Typhoon No. 21) and the earthquake in Hokkaido. But with more than six months having passed since then, it is difficult to explain the current slowdown of export of goods with these factors. The slowdown seems due to the global manufacturing industry entering a deceleration phase and mounting concerns over the US-China trade war, risk factors pointed out by Sakamoto (2018).

The export of goods plays a significant part when projecting the future of Japan's economy because domestic demand, such as personal consumption that supported the nation's economic growth in the first half of 2019, is expected to decelerate after the latter half of the year.¹ It should be noted that Japan's consumption tax is scheduled to be raised in October 2019. As a counter measure for the hike of consumption tax rate, Japanese government will prepare for a larger economic package than in the past (Hattori et al. [2018a, 2018b]). So, we believe that a major slump in personal spending can be avoided, though uncertainty will continue to loom over the situation. Under these circumstances, if external demand remains weak, and if the export of goods continues to decline in the future, the possibility of a recession will arise.

Among export of goods that began to weaken after the October to December period of 2018 when the impact of the natural disasters had faded, information-related goods and capital goods were the



Note: Data are three-month moving averages.
Source: Made by MHRI based upon the Bank of Japan, *Developments in Real Exports and Real Imports*.

¹ Refer to Mizuho Research Institute (2019).

most sluggish items. While signs of the former items bottoming out have started to emerge, the latter items continue to be slow on average, albeit capital goods increased significantly in April (**Chart 1**). In this report, we will focus on capital goods exports to forecast the future trend.

2. Semiconductor/FPD manufacturing equipment, industrial robots, and metal forming machinery are weakening

So what are the reasons that the export of capital goods is weakened? To clarify the situation, we use the Indices of Industrial Production to grasp the trend of capital goods shipments by item and uncover which items may be contributing to the decline in capital goods exports.

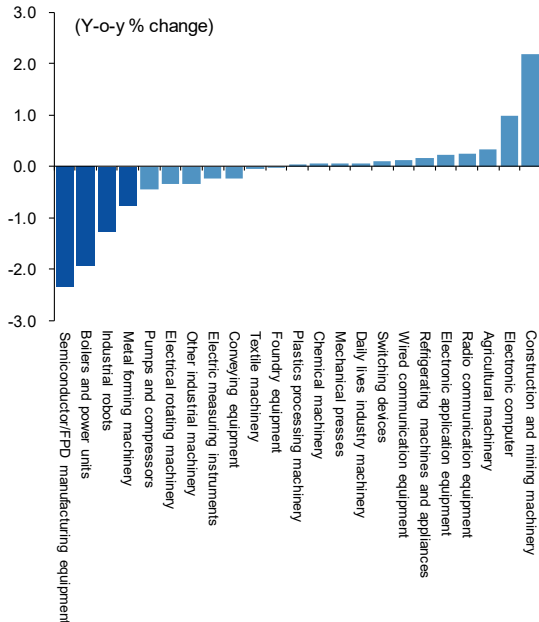
Chart 2 depicts the cumulative contribution of capital goods by item from October to December 2018, the period when the downward from natural disasters was fading, to the current period. The graph reveals that among capital goods shipments, semiconductor/flat panel display (“FPD”) manufacturing equipment, boilers and power units, industrial robots, and metal forming machinery were the primary products responsible for the decline.

However, boilers and power units recorded a significant drop in the period from April to June 2019 (**Chart 3**), and this may be a temporary decline. We therefore chose semiconductor/FPD manufacturing equipment, industrial robots, and metal forming machinery, which have been sluggish on a consistent basis, for further analysis.

Since the Indices of Industrial Production mentioned earlier also include domestic shipments, we used the trade statistics to confirm whether exports of the three items are really declining. To match the category of items in the Indices of Industrial Production and trade statistics, we used a matching table from the Bank of Japan’s “Corporate Goods Price Index.”

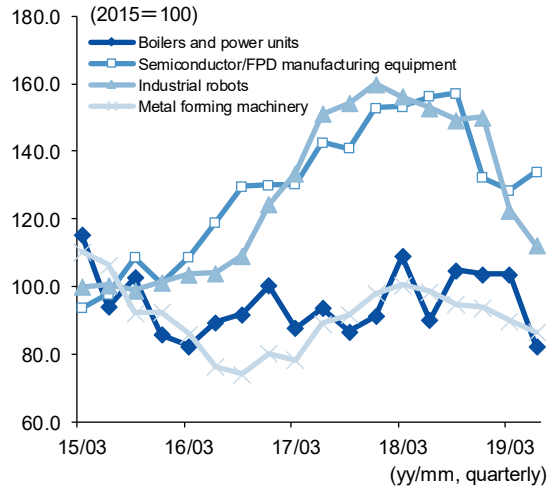
Chart 4 presents the movement of export value of those three items that declined in the product categories by the trade statistics. Semiconductor/FPD manufacturing equipment moved downward toward April to June 2019, the most current period, after hitting its peak in January to March 2018. Both industrial robots and metal forming machinery have slowed since the latter half of 2018, and industrial robot exports have notably declined recently. These data suggest that those three items of semiconductor/FPD manufacturing equipment, industrial robots, and metal forming machinery are the main products dragging down capital goods exports.

Chart 2: Cumulative contribution of capital goods shipments by item (October 2018 – June 2019)



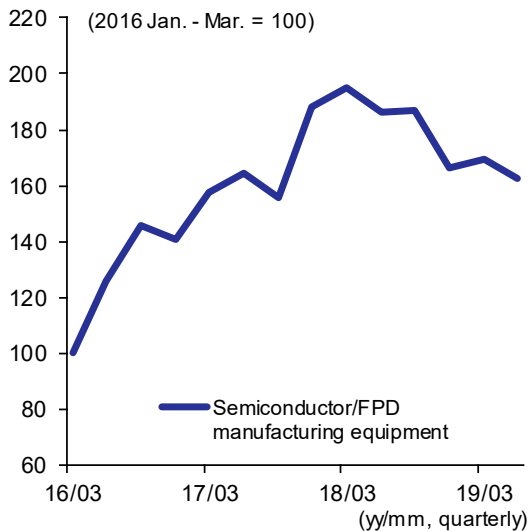
Note: Capital goods shipments for each item include those bound for the domestic market.
 Source: Made by MHRI based upon the Ministry of Economy, Trade and Industry, *Indices of Industrial Production*.

Chart 3: Shipment of semiconductor/FPD manufacturing equipment, boilers and power units, industrial robots, and metal forming machinery

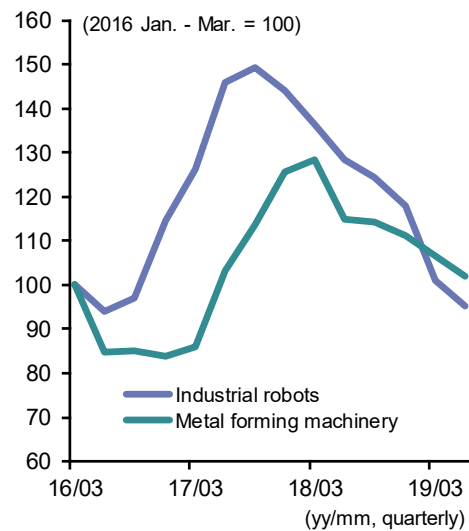


Note: Capital goods shipments for each item include those bound for the domestic market.
 Source: Made by MHRI based upon the Ministry of Economy, Trade and Industry, *Indices of Industrial Production*.

Chart 4: Indices of export value by item
 [Semiconductor/FPD manufacturing equipment] [Industrial robots, metal forming machinery]



Note: Data above are seasonally adjusted by MHRI.
 Source: Made by MHRI based upon the Ministry of Finance, *Trade Statistics of Japan*.



Note: Data above are seasonally adjusted by MHRI.
 Source: Made by MHRI based upon the Ministry of Finance, *Trade Statistics of Japan*.

3. Automobile and IT markets in an adjustment phase and intensified US-China trade friction have pushed down capital goods exports

Next we detail the background of weak exports for the three items. Our conclusion is that capital goods exports declined most probably because the automobile markets in the US and China as well as the global IT market that have a great impact on Japan are entering an adjustment phase, and uncertainty is mounting with the escalating US-China trade war.

(1) Semiconductor/FPD manufacturing equipment exports were pushed down by stock adjustments and the trend to refrain from investing on the back of US-China friction

Semiconductor/FPD manufacturing equipment exports recorded a year-on-year decline from October to December 2018 and have remained in the negative territory for three consecutive quarters (**Chart 5**). Looking at the data by destination country, exports bound for South Korea and China particularly decreased. We examined the background of this decrease by checking data of semiconductor and FPD manufacturing separately. Then we found that it stemmed from stock adjustments and the trend to refrain from capital investments due to the US-China trade war.

First, the decline in semiconductor manufacturing equipment exports can be explained by the strong stock adjustment pressure as a repercussion of past large-scale investments (refer to Miyajima, et al. [2019]). As Yazawa and Miyajima (2018) pointed out, a semiconductor boom emerged as investment in data centers buoyed toward the first half of 2018, and this boom led to a sharp increase in investment in semiconductor manufacturing equipment. Nonetheless, as the semiconductor market entered an adjustment phase, manufacturing equipment piled up as excessive stock relative to actual demand, and partly as a repercussion of this boom, new investment in the product is now subdued. In fact, according to the 2019 global semiconductor manufacturing equipment sales forecast announced by the industry association SEMI in July, sales are expected to decline by 18.4% year on year. This figure is a downward revision of the previous year-on-year projected decline of 7.7% made in December 2018 and it reveals that companies are refraining from making investments in semiconductor manufacturing equipment.

Next, the reason why FPD manufacturing equipment fell is thought to be the excessive supply of FPDs as a result of Chinese manufacturers making huge investments to promote domestic production. This has resulted in firms restricting investment activities to produce manufacturing equipment. Moreover, worse than expected sales of TVs and smartphones, which are the main users of FPDs, may have negatively affected the investment attitude of manufacturers. The fourth round of tariff increases as well as export restrictions by the US against Chinese goods has increased uncertainty and made it more difficult to predict the future supply and demand of FPD manufacturing equipment, and this may also have led

manufacturers to postpone their decisions on capital investments.

(2) Exports of industrial robots have slowed down by such as manufacturing industries in the US and China entering an adjustment phase

Exports of industrial robots have continued falling for five consecutive quarters since the April to June period of 2018, with the rate of decline widening (**Chart 6**). By country, exports to the two major markets of the United States and China are particularly declining. After the April to June period of 2018, exports to the US have been on a declining trend, and the rate of decline of exports bound for China has also accelerated.

As factors that could make a positive contribution to export growth in industrial robots, Sakamoto et al. (2018) lists (1) improvement in investment appetite backed by recovery in the global economy, (2) rise in labor-saving demand following the birthrate decline and population aging on a global scale, and (3) policy support based on “Made in China 2025.” Of these three factors, (2) should continue to be a growth driver of industrial robots since population dynamics do not change in the short term.

But for factor (1), sluggish sales of new smartphone models and automobiles in China (Yamato [2018]) and so forth are having a negative impact on the markets that are the largest destination for industrial robots, and the investment appetite for such robots seems to be decelerating centered on the IT and automobile markets in the US and China. Also, with a string of large-scale global investments related to environmental regulations on automobiles coming to an end, it seems unlikely that new investment projects will emerge.

Concerning factor (3), as rising tensions between the US and China make it difficult for the Chinese government to execute its policy support measures, such as granting subsidies on a massive scale. Along with its shift in policy to promote domestic production, China may have put the brakes on imports from Japan.

(3) Exports of metal forming machinery are declining mainly by machining centers; this decline may be in conjunction with the fall in exports such as industrial robots

If we confirm the movement of the more detailed category of metal forming machinery in the trade statistics (**Chart 7**), machining centers stand out as a particular product not doing well. A machining center is a machine tool capable of processing many kinds of metal on a continuous basis² and is used to process car engines and smartphones.

Machining center exports have decreased year on year for four consecutive quarters since the July to September period of 2018, and the rate of decline is currently expanding. Looking at its contribution to exports by nation, its negative contribution to exports to China is notably large.

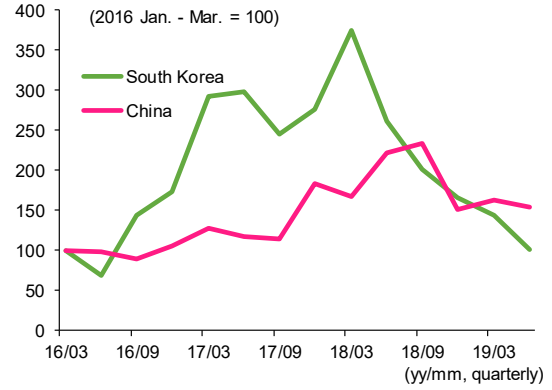
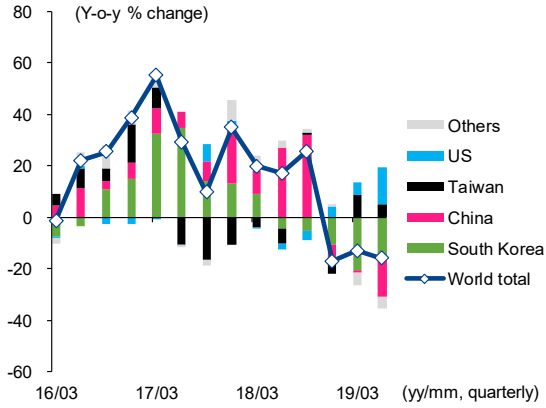
Just like for semiconductor/FPD manufacturing equipment and industrial robots, the

² Refer to the Japan Machine Tool Builders’ Association, “Various Types of Machine Tools and Forming Methods.”

Chart 5: Export value of semiconductor/FPD manufacturing equipment

[Contribution by country (y-o-y change)]

[Export value indices for South Korea and China]

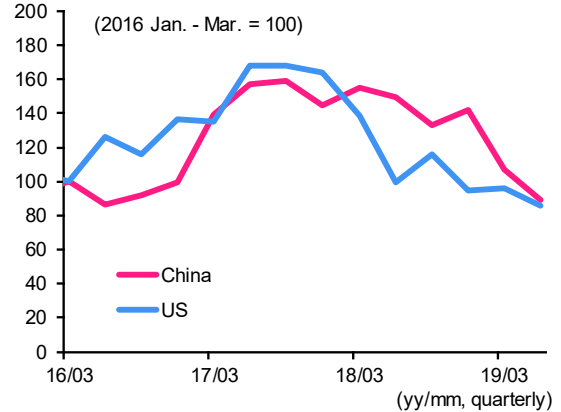
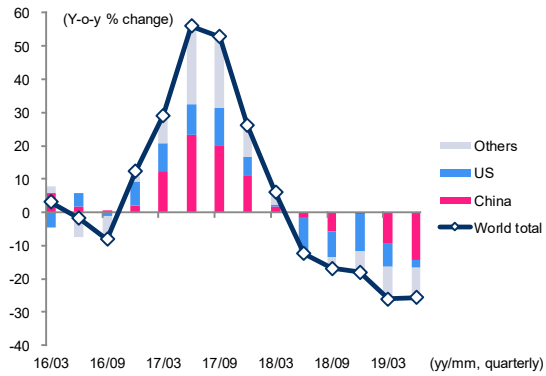


Note: Data above are seasonally adjusted by MHRI. Contribution by country is raw data.
Source: Made by MHRI based upon the Ministry of Finance, *Trade Statistics of Japan*.

Chart 6: Export value of industrial robots

[Contribution by country (y-o-y change)]

[Export value indices for the US and China]



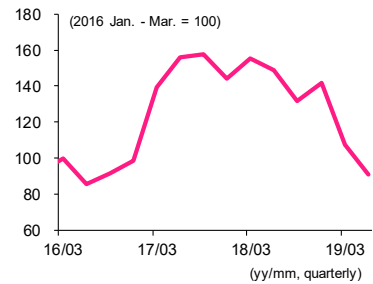
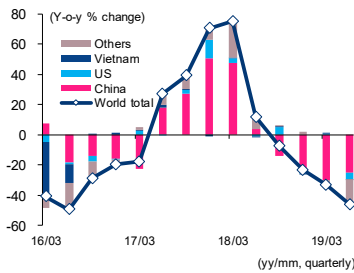
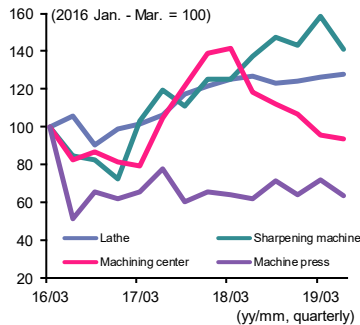
Note: Same as above.
Source: Made by MHRI based upon the Ministry of Finance, *Trade Statistics of Japan*.

Chart 7: Export of metal forming machinery

[Breakdown of metal forming machinery exports]

< Export value of machining centers >
[Contribution by country (y-o-y change)]

[Export value index for China]



Note: Same as above.
Source: Made by MHRI based upon the Ministry of Finance, *Trade Statistics of Japan*.

factors behind this downward trend include the slowdown of China's economy (refer to Miura [2018]), the adjustment phase in the US and Chinese automobile industries and semiconductor cycle on a global scale, and the intensification of US-China trade friction. Also, as mentioned earlier, sluggish sales of smartphones and the end of large-scale investment projects in the semiconductor and automobile sectors, which are main demand destination, are adding to the decline in machining center exports.

In addition, the weak performance of semiconductor manufacturing equipment and industrial robots' exports seems to have led to a slash in demand for machining centers. Machining center also manufacture parts for semiconductor manufacturing equipment and industrial robots. Hence, it should the demand for these products decline, so will the demand for machining centers.

4. Orders suggest a low possibility that capital goods exports will hit bottom in the latter half of 2019

We have thus far examined the background of slumping exports of semiconductor/FPD manufacturing equipment, industrial robots, and machining centers. Whether demand for those three items will pick up in the future is a crucial point in predicting the development of capital goods exports in the coming years. We now refer to Hori et al. (2016) to project their future development based on overseas order statistics (external demand of machinery order statistics).

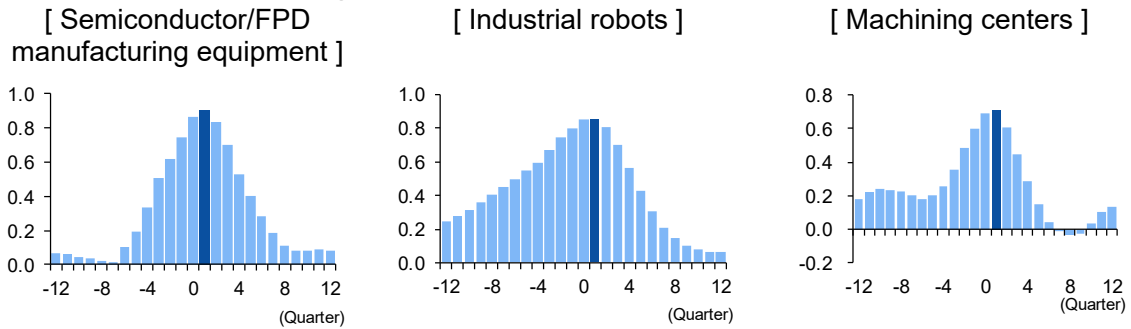
First, we look at the relationship between exports and orders of those three products in question. Normally, semiconductor manufacturing equipment makers begin to manufacture and ship products after receiving orders from their customers, and there is a certain time lag between orders and shipments. As we calculated the timing correlation for each product on a quarterly basis to measure the time lag between the order received from overseas and its shipment³ (**Chart 8**), the lag of one period produced the biggest correlation, followed by two periods with a reasonably strong correlation. These results suggest that orders arrive one to two quarters before their actual export. Hence, we can predict the export trend of at least one to two quarters from present by looking at the orders received for each product.

Chart 9 depicts the orders received from overseas for each product. The graphs reveal that orders of semiconductor/FPD manufacturing equipment and machining centers continued to fall even in the April to June period with no hint of bottoming out. Orders of

³ Since the data of semiconductor manufacturing equipment in "Machinery Orders" have not been available since June 2017, we used the data of electronic computers, etc. as a substitute. It should be noted that as of 2016, semiconductor manufacturing equipment accounted for 91% of total orders in the machinery order statistics. Also, since the order amount of machining centers alone is not disclosed, we used the order amount of machine tools as a substitute.

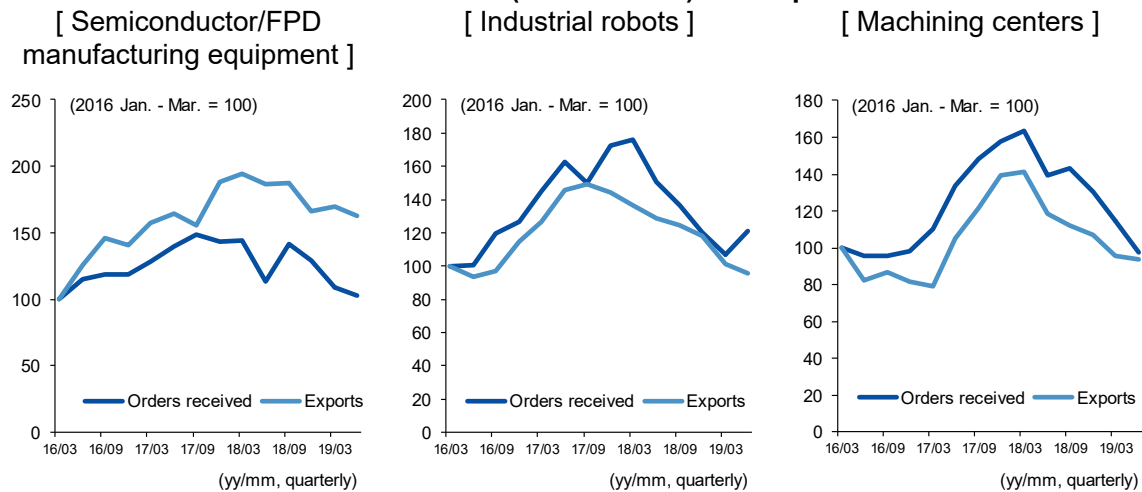
industrial robots stopped their decline in the April to June period, but this may be a repercussion of an acute order adjustment, and it is too early to judge whether it will recover in the coming quarters. Looking at the order trend, we cannot say that exports of those three items will return to a growth track anytime soon, and hence we expect the trend of capital goods exports to remain flat for a certain period in the future.

Chart 8: Timing correlation of exports and orders (for overseas)



Notes: 1. Data above use figures seasonally adjusted by MHRI. The sample period is from January to March 2007 to April to June 2019.
 2. We used “electronic computers, etc.” for orders of semiconductor/FPD manufacturing equipment and “machine tools” for machining centers.
 Source: Made by MHRI based upon the Cabinet Office, *Machinery Orders*, and the Ministry of Finance, *Trade Statistics of Japan*.

Chart 9: Orders (for overseas) and exports



Note: Same as above.
 Source: Made by MHRI based upon the Cabinet Office, *Machinery Orders*, and the Ministry of Finance, *Trade Statistics of Japan*.

5. Increasing uncertainty caused by heightened tensions between the US and China may place downward pressure on overseas orders

Furthermore, if uncertainty over the future increases driven by risk factors such as the escalating US-China trade war, companies may become even more cautious about making new capital investments. As a result, orders from overseas mentioned earlier may decline even further. It can be caused a double bottom of capital goods exports by further pushing down the lowest level already reached.

As Sakai et al. (2018) indicated, mounting uncertainty as a result of such factors as the deepening trade war will push down capital investment. In sum, if uncertainty rises on a global level, worldwide investment demand will cool and drag down the number of orders that Japanese firms receive from overseas customers, ultimately leading to a decline in capital goods exports.

With a view to confirming this hypothesis, we conducted a time-series analysis by referring to Sakai et al. (2018). In specific terms, we used the four variables of (1) Global Economic Policy Uncertainty Index (from the Economic Policy Uncertain Index), (2) World Industrial Production Index (from the CPB Netherlands Bureau for Economic Policy Analysis),⁴ (3) Effective Exchange Rate (the Bank of Japan), and (4) Real Orders from Overseas for each product (from the Cabinet Office and the Bank of Japan)⁵ to conduct a structural VAR analysis.⁶

Chart 10 shows the changes in overseas orders for each product under the shock of mounting uncertainty on a global scale (impulse response when a shock of one standard deviation is given). The graphs reveal that overseas orders for each product declined between quarters 0 and 2.⁷ This means as global uncertainty rises, companies of all over the world tend to adopt a more cautious stance on investment, and it is highly likely that this will place downward pressure on Japan's capital goods orders.

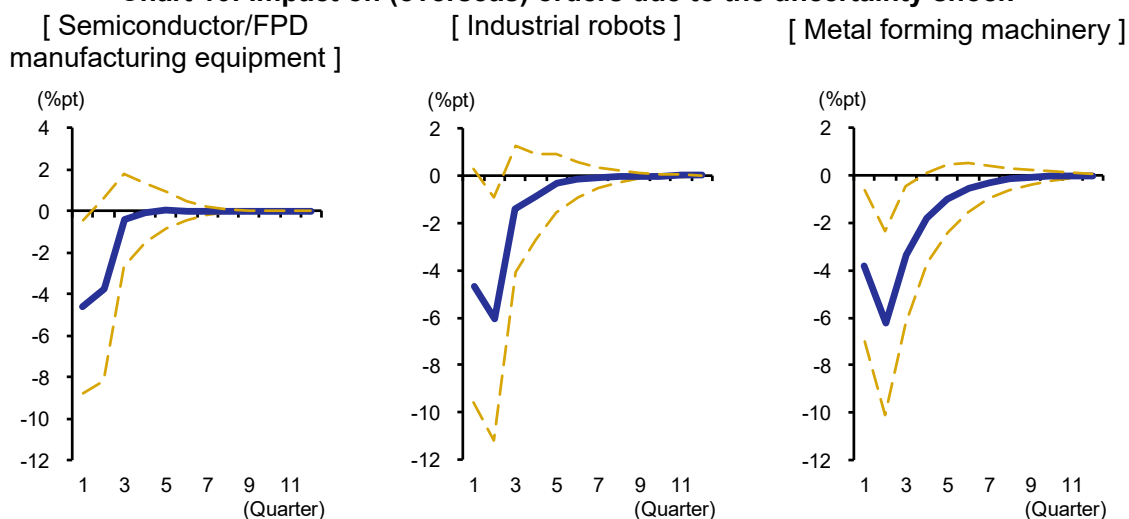
⁴ We estimated the index from the weight where the data series, excluding Japan's production, is disclosed.

⁵ For each product we calculated the real value using the export price index of the Bank of Japan's "Corporate Goods Price Index."

⁶ For details of the structural VAR, refer to the supplementary discussion of Sakai et al. (2018). In this report, we assume that exogeneity is high in the order of Global Economic Policy Uncertainty Index → Effective Exchange Rate → World Industrial Production Index → Real Orders from Overseas for each product. The sample period is from January to March 2000 to January to March 2019. All variables take the logarithm differences, and we set the lag at one quarter by referring to the HQ information standard.

⁷ The impulse response was within a 95% confidence interval for semiconductor/FPD manufacturing equipment in quarter 0, industrial robots in quarter 1, and metal forming machine in quarters 0–2.

Chart 10: Impact on (overseas) orders due to the uncertainty shock



Notes: 1. The dotted lines represent a 95% confidence level. Data represent the value of orders for each product when the world uncertainty index shock of one standard deviation is given (change in the year-on-year growth rate).
 2. We used "electronic computers, etc." for orders of semiconductor/FPD manufacturing equipment and "machine tools" for metal forming machinery.

Source: Made by MHRI.

6. The timing of recovery capital goods exports may delay for the latter half of 2020; we need to be alert to risks arising from international affairs

In the light of the analysis made thus far, we will now sum up how the future direction of capital goods exports can be viewed. If we look at the trend of machine orders and external demand for these three items that have been weighing down capital goods exports since late 2018, there seems to be little sign of bottoming out in the latter half of 2019, and therefore overall capital goods exports will likely remain sluggish. If we refer to the balance of production and inventory, the adjustment phase of the global IT market as well as the US and Chinese auto markets, which reached a trough in 2019, is expected to come to an end. In this case, investment in these sectors will likely start to recover gradually, and we can expect capital goods exports to pick up from the middle of 2020.

On the other hand, the potential for uncertainty that may restrain firms' capital investment, such as the intensification of US-China trade friction, has shown no sign of letup. In fact, the United States announced the fourth tariff increase on Chinese goods in September. Products like smartphones and laptop computers, which are highly dependent on imports from China, will be the target of tariff hikes from December this year. Furthermore, if the Chinese economy becomes exposed to downward pressure because of these tariff increases, Japan's exports bound for China may likewise be negatively affected. If trade friction heats up even further, the adjustment phase of the automobile and IT markets may stretch beyond the expected period to late 2020, pushing back the timing of recovery in capital goods exports to the latter half of 2020.

Not only the deepening of US-China friction, but also the eruption of conflict between South Korea and Japan as a result of South Korea's removal from Japan's "white list" of preferred trading partners, the risk of a no deal Brexit due to the rise of new British Prime Minister Boris Johnson, the outlook of Japan-US trade negotiations – the risk factors facing the economy in the future are too many to enumerate.

Since it is believed that settling these many risk factors will be time consuming, the future direction of Japan's capital goods exports will largely depend on the development of international affairs. We hold that capital goods manufacturers will need to be alert to the overseas situation in the coming years.

Reference

Refer to the original Japanese report by clicking the URL below for the reference material

<https://www.mizuho-ri.co.jp/publication/research/pdf/insight/jp190902.pdf>