

Signs of Recovery in Export Volume ~ Judgments Impacted by Seasonal Adjustment ~

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Is the current volume of Japanese exports on the rise, or are shipments out of Japan in decline? Economists are at odds in their interpretations of export volume – an important factor in viewing the future prospects of the economy. One reason for the differences in views is that the seasonally adjusted figures for export volume shift dramatically by the method of adjustment being used.

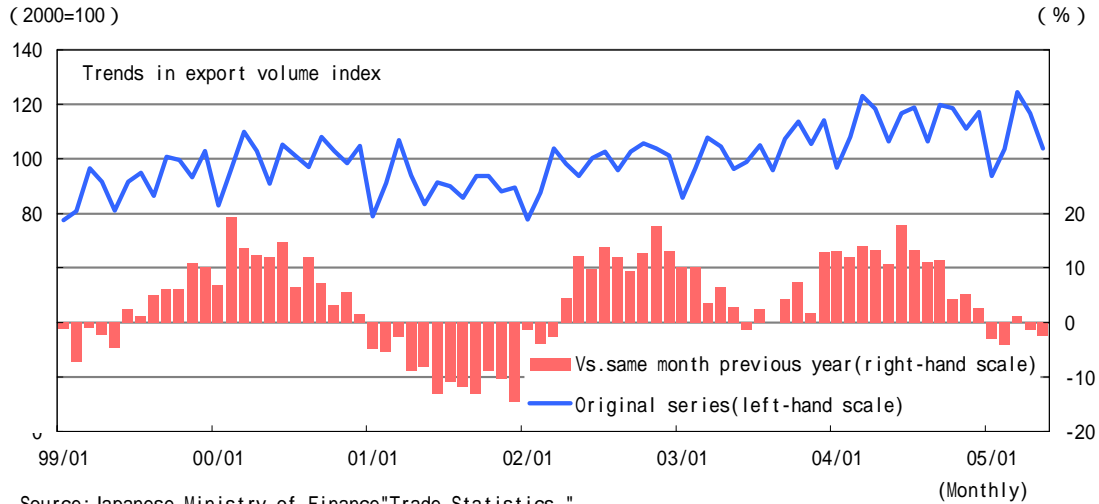
After studying various different seasonally adjusted figures, when also bringing calendar factors into the picture, exports can be seen as being in a recovery trend overall. However, Asia-bound shipments continue in a downward trend, with an economic recovery in the Asia to be required to sustain export expansion from here on.

Fluctuation Factors Include Holidays, Days of Week, Leap Year

The export volume index records wide swings every month, rendering it difficult to grasp specific trends. While it is possible to track major tendencies via comparisons with the same month the previous year, this approach is naturally impacted by the figures from the same months a year ago, the number of weekdays in each month and other variants, making it tough to accurately perceive what is occurring at the more recent points in time (Graph 1).

To compensate for these factors, it is essential to examine seasonally adjusted figures for which seasonal factors have been removed from the original series. For the method of seasonal adjustment, the majority of economic statistics use the X-12-ARIMA approach developed by the United States Department of Commerce. Basically speaking, seasonal adjustment is conducted in the following sequence: First, the original series centered moving average (the average for a certain point in time when using the figures both before and after that point) is computed, with the components deviating from that broken down into seasonal variations and random variations. Next, the seasonal factors that are produced are extracted from the original series, with the seasonally adjusted figures plotted.

Graph 1 Tough to Grasp “Current Status” Using Original Series or Previous Year Comparisons



One of the problems with this process is the inability to obtain a centered moving average, due to the simple fact that there are no future figures available at the latest point in time. With X-11 and other conventional seasonal adjustment methods, for the data close to the latest point in point only past figures have been used to compute the moving average figures statistics. As a result, major shifts emerged when new figures were announced. With X-12-ARIMA, a time series analysis is used to project the direction to be followed by the series, with the centered moving average plotted on a series that includes the projected values in order to minimize divergence from the latest seasonally adjusted figures.

With X-12-ARIMA, furthermore, it is also possible to remove the fluctuation factors that have proved impossible to eliminate to date simply by taking the moving average and removing the seasonal factor. This refers to: (1) Impact from differences in the numbers of each day of the week during any given month; (2) the impact of leap years; (3) the impact of holidays, the “Golden Week” consecutive holiday season of late April/early May, and other so-called “calendar factors.” It is hardly difficult to imagine that the volume of economic activity will vary by the days of the week. In the case of export volume, in reflection of production activity there will be lower volumes going out on Sundays and Mondays, for example, with the figures conversely rising for Wednesdays, Fridays and so forth. With leap years, the one extra day in February may very well increase the total production for February of that year. When there are more national holidays or other vacation days, it is reasonable to conclude that the production activities during that month will be low. With X-12-ARIMA, it is possible to compute seasonally adjusted figures that factor in these elements.

Signs of a Pickup in Export Volume Index

Let’s use X-12-ARIMA to study seasonally adjusted figures for the export volume index. Because the Ministry of Finance does not issue seasonally adjusted figures, any

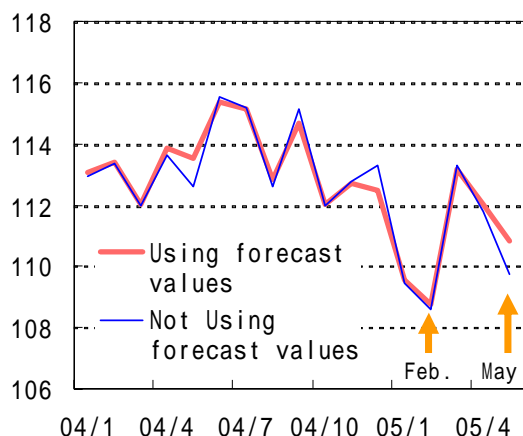
analyzer of this data must prepare the seasonally adjusted figures on their own.

The two sides of Graph 2 present the movements in the export volume index during the same period of time. Examining the fluctuations in the figures plotted in (a), there is the impression that the export volume is in a downward trend. With the figures in (b), however, it is possible to interpret the movements as suggesting signs of a Pickup in export volume.

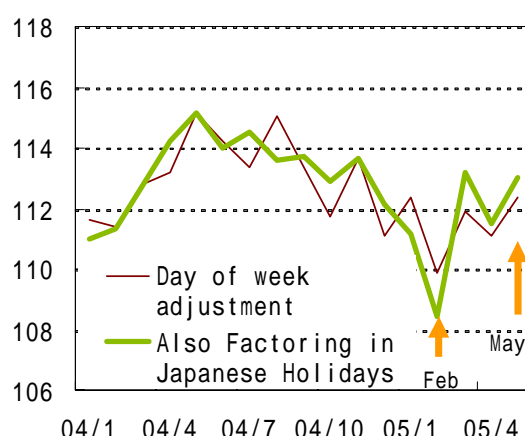
Graph 2-(a) shows seasonally adjusted values with no reflection of calendar factors. We can see that in the case of not using projected values and preparing the moving average from past data, and in cases when projected values are used to reach a centered moving average, the data for the latest point in time (May 2005) shows a slight change in the degree of decline. However, that difference is not great enough to alter our judgment of the current status.

Graph 2 Wide Changes in Seasonally Adjusted Value by Method

(a) Using forecast Values



(b) Including Calendar Factors



Source: Seasonal adjustments added by the author to the export volume index (from Ministry of Finance "Trade Statistics"). (Monthly)

However, the plotting of these lines changes considerably by whether or not the calendar factors are reflected in the results. Graph 2-(b) uses projected values and also reflects the calendar factors. The thinner line reflects the variations in economic activity by day of week, and also adjusts for the leap year. The thicker line includes additional factors for Japanese national holidays, Golden Week and other vacation days.

When the calendar factors are not reflected, exports decline broadly in May. When the calendar factors are added, however, a major difference in the results emerges in the form of growth in May exports over the level achieved in April. In addition to the day of the week effect, consideration for national holidays, Golden Week and other vacation time causes the indicators to smooth out.

Examining the calendar factor estimate formulas, I would conclude that the effects from the days of the week, national holidays and other sources become statistically significant and viable as seasonally adjusted values when the Japanese national holiday factor is also included in the computations. It can also be said that there may in fact have been a recovering in export volume. Incidentally, the large decline in February of this year may be linked to the heavy impact of the Chinese lunar New Year spilling over from

January into February, supporting my view that exports have actually bottomed out at a slightly higher level.

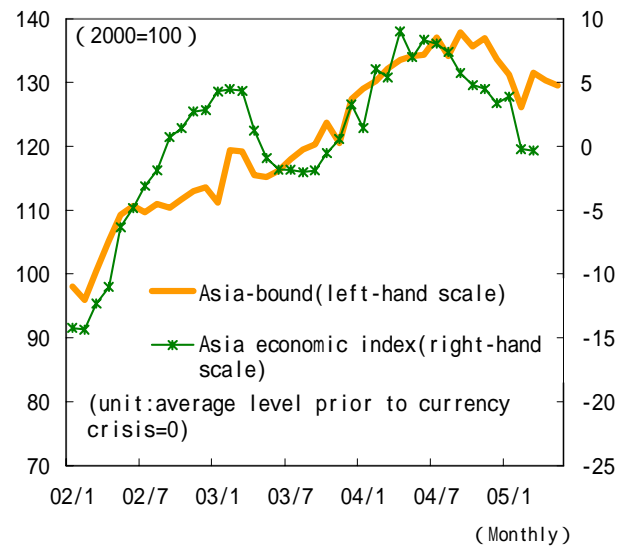
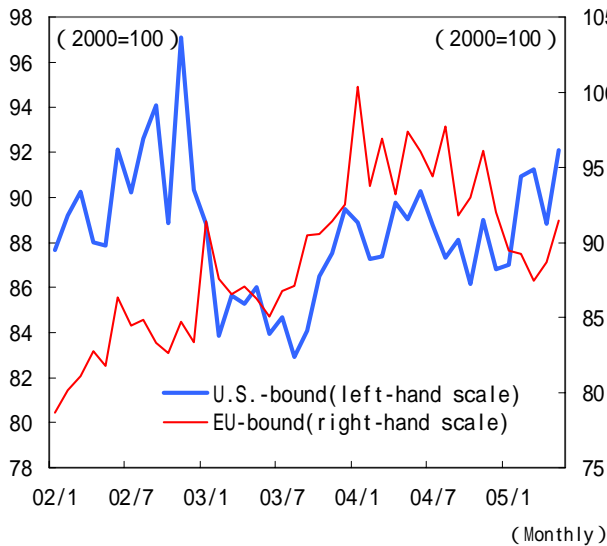
Asia-Bound Exports Continue to Slump

Next, I applied seasonally adjusted values to the export volume index by destination. Based on this, we can clearly see that shipments to the United States and Europe are recovering, while those to Asia continue in the doldrums. For the seasonally adjusted values, in addition to adjustment for the days of the week, I also factored in Japanese national holidays. Examining Chart 3, we can see that shipments to the European Union (EU) have shown signs of recovery over the past two months, while exports to the U.S. are likewise in a recovery tendency, albeit somewhat zigzag when graphed. Asia-bound exports, in contrast, have yet to pull out of their slump (Graph 4). Combined with the “Asia Economic Index” issued by the Japan Center for Economic Research (JCER), these figures indicate general linkage between the state of the Asian economies and the volume of exports being shipped to Asia.

In conclusion, I believe that the question of whether an overall recovery in exports will occur from here on depends on whether or not a recovery of the Asian economies is accompanied by resurgence in Asia-bound shipments.

Graph 3 U.S./EU-Bound Exports Recovering

Graph 4 Asia-Bound Exports Linked to Local Economies



Source: Japanese Ministry of Finance "Trade Statistics", Japan Center for Economic Research (JCER)