Chapter 6

Analysis of Competitiveness in East Asian Countries and Regions, and USA :

Analysis of RCA and the Correlation between RCA and Export Quantity and Price Indices

KAJIWARA Hirokazu

The goal of the research discussed in this paper was to study the ways in which export quantity and export price (unit value) indices change in relation to Revealed Comparative Advantage (RCA below), which functions as an index of competitiveness, and the specific characteristics of that change for specific nations, in this case Japan, the US, the Asian NIEs, the ASEAN4 nations and China.

1. Analysis of RCA

Analysis of RCA reveals a number of changes: the industrialized nations Japan and the US are focused on machinery industries, with the NIEs progressing towards the same model. China and the ASEAN4 nations have succeeded Japan and the NIEs in terms of competitiveness in the SITC 6 and 8 categories. In addition, division of labor is progressing in East Asia, and both export RCA and import RCA for machinery industries are increasing.

Given that when export RCA increases import RCA declines and when import RCA increases export RCA declines, the coefficient of correlation between the two can be expected to be negative, i.e.

to produce a line sloping downwards to the right when plotted on a graph. The coefficients of correlation between Japan and South Korea are all negative, indicating that import and export RCA are moving in opposite directions. However, because the correlation was studied by plotting on a scatter diagram without consideration of period, it is unclear whether the negative coefficient is generated by a decline in import RCA against an increase in export RCA (case 1 below) or an increase in import RCA against a decline in export RCA (case 2 below). Looking at actual figures, we find that for Japan, SITC 5 commodities are case 1, while all other categories are case 2. South Korea displays a strong rise in export RCA, with SITC 5, 6 and 7 case 1 and SITC 8 case 2. Change in competitiveness is strongly marked in the cases of the US, Thailand, Indonesia, Taiwan and Hong Kong, with three out of four coefficients of correlation being negative for each. All are case 2 for the US and all are case 1 for Thailand and Indonesia. While not as marked as that of Japan and the US, both Taiwan and Hong Kong show a tendency towards decline in competitiveness, with each nation displaying one example of case 1

and two examples of case 2. China shows two negative coefficients, with both being examples of case 1. Malaysia and the Philippines each show one negative coefficient, produced by case 1, while Singapore's single negative coefficient is an example of case 2.

Overall the rate of negative correlations is 63%. The remainder are positive, i.e. export RCA and import RCA increase and decrease in unison. In the cases of the US and Singapore, they decrease in unison, while they increase in unison in the cases of Thailand, Indonesia and China. The closer the coefficients are to zero the greater the increase in export RCA, and the low positive coefficients for the ASEAN4 nations therefore indicate a certain level of increase in export RCA.

Total export value is determined by multiplying export quantity by export price. Export value is therefore increased by increases in export quantity or export price. However, given that increased export prices leads to a loss of price competitiveness, over the long-term we are able to regard increases in export value as being generated specifically by increases in export quantity. This project examined the correlation between export quantity indices and export price indices formulated by Masato Kuroko of IDE-JETRO. A positive coefficient can be generated by either a simultaneous increase or decrease in quantity and price. All the positive values for the countries examined in this project were the result of increases in both indices. The closer the coefficient is to zero the greater the increase in either of the indices, but as indicated above, there are no cases in actuality in which there is a long-term increase in price but virtually no increase in quantity. Therefore, for the countries studied in this project, the increase in export quantity was greater than the increase in export price the closer the positive coefficients approached to zero.

Negative coefficients were generated by either of two scenarios: An increase in export quantity indices with a decrease in export price indices, or a decrease in export quantity indices with an increase in export price indices.

Negative coefficients were displayed in 10 cases: for total commodities, primary commodities and SITC 7 commodities for China, SITC 5 and 7 commodities for Indonesia, SITC 7 commodities for South Korea, SITC 5, 6 and 7 commodities for Malaysia and SITC 7 commodities for Singapore. All were generated by a decrease in export price indices against an increase in export quantity indices. The high representation of SITC 7 here indicates that the increase in the export quantity and decrease in the export price of electronic products and components is centered mainly on the category of general purpose goods. All other coefficients were positive and high overall, indicating simultaneous increase in export quantity and export price. Increases in quantity were of course greater than increases in price in all cases, and as indicated above there were no cases in which only prices have increased. Quantity has been a more important factor than price in the increase in total export value occurring in East Asia's rise as a key region in global industrial production. This may be ascribed to the enhanced competitiveness generated by increased productivity, etc.

2. Correlation between export quantity, price indices and RCA

Given that decreases or slow increases in export prices can be considered to enhance competitiveness, i.e. increase RCA, and increases in export prices can be considered to cause competitiveness to decline, i.e. decrease RCA, the correlation between RCA and export price indices can be predicted to be negative

and to tend to approach zero, that is, to plot a line descending to the right on a graph. The table shows 18 negative figures and 10 from 0 to 0.3, representing 63.6% of the total; if we allow price changes representing up to half of RCA and include coefficients of correlation up to 0.5, we have 37, or 84.1%, of the total which display the predicted change. The changes represented here are decreases in RCA and increases in export price for Japan, the US and some of the NIEs, and increases in RCA and decreases or slow increases in price for China and the ASEAN nations. Because a large number of commodities are included, we cannot expect all the commodities to display identical changes, but the results do indicate the changes in export quantity and value have a significant effect on export RCA.

From the coefficients of correlation between RCA and export quantity indices we can predict that increased competitiveness (i.e. an increase in RCA) will result in an increase in export quantity and reduced competitiveness (i.e. a reduction in RCA) will result in a decrease in export quantity, and we can also expect that the two variables will change in the same direction. That is, a plot on a graph rising from left to right should show a positive coefficient of correlation. 29 positive figures are shown in Table 4, representing 65.9% of the total. Negative figures are generated by a reduction in RCA and an increase in export quantity indices. Because a large number of commodities are included, if we allow slow decreases in RCA and increases in export quantity and include coefficients up to –0.3, 81.8% display the predicted changes. Results generated using statistics based on a large number of commodities possess considerable explanatory power.

It will be necessary to analyze the relationship between RCA and export price and quantity using more detailed classifications. However, a long-term analysis should produce results largely in accord with those discussed in this paper.

3. Chang in future

The machinery category is characterized by the large number of commodities and components produced, the length of the roundabout production process, and the constant development of new products and new technologies. In addition, it is an area with a high degree of potential for expansion and deepening of intra-industry division of labor. In the past, Japan displayed a ratio of imports of manufactured goods which was unusually low for an industrialized nation; this was explained by the fact that Japan could not achieve the division of labor with its neighboring nations which was available to the US and European nations. However, the potential increased as intra-industry division of labor progressed with the development of Japan's neighboring nations and the increasing concentration of the export sector on machinery.

The majority of East Asian machinery exports are intra-regional, followed by exports to the US and then to Japan, demonstrating the increasing intra-regional division of labor in the machinery sector. In the 1970s only the US had a high intra-industry trade index; the index for East Asia was less than 0.2 (the closer to 1 the index is, the greater the advancement of division of labor). More recently, figures for East Asia have been clustered between 0.3 and 0.5. In particular, indices have been high in machinery-related industries in a large number of countries since the 1980s, demonstrating the fact that division of labor has been a prerequisite for development of the machinery industries. Intra-industry trade indices are high for all the countries shown on the accompanying table, and the

division of labor will undoubtedly increase in the future in the East Asian region, given the prediction that change in the industrial structure will be towards concentration on the machinery industries. The trend towards the conclusion of bilateral and regional free trade agreements will presumably function to hasten the realization of this prediction.