Preface

Conversion of Trade Statistics to IO24 Sector Classification Code and Trade Indices

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The research group of IDE: Institute of Developing Economies "Estimation and Evaluation of Trade Indices" has conducted its research for two years, having been established in 2001. The group's purpose was to focus on the data in conducting an examination of the problems of formulating trade relations models, in addition to calculating trade indexes and examining their utilization, including their relationship to production data.

This volume collects part of the outcome of the research group's studies in estimating and evaluating trade indices to enable analyses of the trade structures of East Asian countries and regions.

This research group continues the work of the "World Trade Statistical Data and Retrieval Systems" research group (Organizer: KINOSHITA Soshichi, secretary: NODA Yosuke), established at the IDE in 1993. Part of the results of this group's research, was published as *World Trade Ddata System: Arrangement and its Application* (SDS No. 67), edited by Kinoshita and Noda. The major focus of that volume was various aspects of the preparation of data for the formulation of world trade matrices. In the section dealing specifically with the preparation of data, it discussed processing methods utilizing relations of correspondence between revisions of product classification codes and examined changes to nations and customs regions. The volume also looked at the formulation of world trade matrixes, discussing diverse issues related to world economic models, including export deflators.

The most recent study group took a fresh approach to the use of trade statistics in the formulation and evaluation of world trade matrices and the calculation of trade indexes, and utilized these indexes in conducting international comparisons. To do this, it employed the results of the preparation and study of world statistical data that it has carried out to date and its subsequent examination of various methodologies.

The most important element in formulating trade price indexes and substantive world trade matrixes is the conversion of the basic data into consistent trade statistics based on common standards of value and quantity. The AID-XT (Ajiken Indicators of Developing economies: eXtended for Trade statistics) database compiled and maintained by the IDE utilizes trade statistics obtained from the UN (UN COMTRADE database), the OECD (ITCS: International Trade by Commodity Statistics on magnetic tape and CD-ROM) and the government of Taiwan (DGBAS, Executive Yuan). This data is converted to a unified code at the IDE to enable it to be used in the database.

The aspect of trade statistics classification categories which presents the greatest degree of difficulty is trade product classifications. Various product classification systems are employed in trade statistics. The major systems are the Standard International Trade Classification (SITC) series formulated by the UN and the Customs Co-operation Council Nomenclature (CCCN) formulated by the Customs Co-operation Council. The CCCN system was initially equivalent to the Brussels Tariff Nomenclature (BTN); it was later entirely revised as the current Harmonized Commodity Description and Cording System (HS) series.

In addition, the various product category series are divided into classification codes at different digit levels, including value of commodity total. Conceptually speaking, the most detailed of these digit levels are the four- and five-digit level classification codes of the various SITC revisions and the four-digit level of the CCCN series; these are termed basic headings. In the revisions of the HS system, the most detailed classification codes are the sub-headings of the six-digit level classification codes.

At the IDE, the classification codes which do not have lower digit level codes but have a transaction value greater than zero in the actual trade data employed are termed the most detailed classification codes. These codes are independent of other trade product classification code systems and digit-level product codes. Caution must be exercised, as the basic headings defined by classification code systems and the most detailed product classification codes are not in all cases the same, and the detailed classification codes differ depending on reporting country, import or export division, and year. In addition, it is not unknown that totals of the statistics for classification codes in the lower digit levels in UN and OECD data do not correspond with the upper digit levels.

The data utilized in economic analyses (of international mutual dependence, etc.) and the data required for information searches and data processing are compiled on the basis of the most detailed classification codes. It is necessary to correct this data to ensure that it is consistent, i.e., that the totals for trade transaction values in the various most detailed classification codes correspond with the total values for products. Trade statistics generated using corrected most detailed classification codes are employed as the basic data for the AID-XT. The Trade Index Calculation and Evaluation study group utilized import and export data for the years 1962-1999 drawn from the AID-XT database in formulating world trade matrixes and trade indexes.

The data used in this volume was compiled by taking the trade statistics from AID-XT and by generating world trade matrices from them on the basis of the 24 sectors for the tables set up by the International Input-Output Tables Project of the Institute of Developing Economies. The 11 countries and regions covered are nearly the same as those in the Project, namely China, Japan, the Asian Newly Industrialized Economies (NIEs) of Korea, Taiwan, Hong Kong, and Singapore; the ASEAN 4 countries of Indonesia, Malaysia, the Philippines, and Thailand, and the United States. We looked at their imports and exports from 1962 to 2000, although the information is not necessarily complete for all countries and regions. Since the 24 sectors include 4 service sectors, only 20 sectors correspond to commodity trade categories. In this book, the 24 sectors used in International Input-Output Tables are referred to as the IO24. The codes and descriptions of the IO24 are shown in Table 1.

Creating the world trade matrices requires these trade statistics as well as the SITC and IO24 correlation codes. By taking the common SITC and con-

verting them, we are recompiling value and quantities in terms of the IO24. Since an IO24 code corresponds to the most detailed SITC trade commodity classification codes in the correlation code tables, we need to use the most detailed trade classification code when converting them in trade statistics as well. There is no direct correlation between the HS and the IO24, but since HS and SITC-R3 code correlation tables exist, it is possible to use them to make the conversions.

The trade concentration index, the relative comparative advantage (RCA) index and competitive index used in chapter 6 of this volumn are trade indices other than trade price indices are used to analyze trade structure. When export value and import value can be represented as $X_{rpc}(y)$ and $M_{rpc}(y)$, respectively for each reporting country r, year y, commodity classification c and partner country p. The trade concentration index is,

$$(1) \qquad I_{rp}(y) = \frac{X_{rpT}(y) / X_{rWT}(y)}{M_{pWT}(y) / M_{WWT}(y)}$$

where $X_{rpT}(y)$ is export commodity total(*Total*) from reporting country r to partner country p in term of y, $X_{rWT}(y)$ is export total from reporting country r to partner country *World* in term of y. In the same term of y, $M_{pWT}(y)$ is import total from reporting country p to partner country *World*, $M_{WWT}(y)$ is import total from reporting country *World* to partner country *World*. The export RCA index is for fixed partner country *World*,

$$(3) \qquad RCA_{rc}(y) = \frac{X_{rWc}(y) / X_{rWT}(y)}{X_{WWc}(y) / X_{WWT}(y)}$$

for IO24 sector classification c. Although the trade concentration index above is focused at the national level. the RCA index focuses on concentration at the industry level. Competitiveness indices largely agree with hypothesized changes, but are not as high as the figures generated by RCA calculations. The competitive index is for IO24 sector classification c,

$$(2) \qquad C_{rc}(y) = \frac{X_{rWc}(y) - M_{rWc}(y)}{X_{rWc}(y) + M_{rWc}(y)}$$

Values for this index fall between +1 and –1; the closer the index to +1, the stronger the competitiveness; conversely, the closer to –1, the weaker the competitiveness

This volume is composed of eight chapters and three tables, and is divided into three sections. Papers are presented in sections 1 and 2, and materials will be found in section 3. Section one looks at issues directly related to trade statistics data. The three chapters in this section deal with a range of issues, including problems in the formulation and evaluation of world trade matrixes, the formulation of time series data employing common product classifications, and the formulation and evaluation of trade price indexes. Chapters 4 to 8, which make up section two, look at international comparisons and economic analyses employing various trade indexes in addition to trade price indexes, including horizontal specialization indexes and intra-industry trade indexes.

In Chapter 1, Calculation of Trade Indices Using the IO24 Sector Classifications: Creating a Trade Index Database, KUROKO discusses trade and general indexes formulated using classifications from the 24 divisions of the Asian International Input-Output Tables developed by the IDE, and provides details of the methods used in their formulation. Before discussing the calculations, Kuroko introduces the methods of calculation employed for Hong Kong and Japan. The procedures employed in this chapter take the methods of calculating trade indexes utilized by the Japanese Ministry of Finance as a model. Three calculation procedures are used to generate trade price indices using the IO24 classifications: calculations for each piece of trade statistics data, calculations of trade indices for IO24 categories, and

calculation of general indices.

Chapter 2 is a paper titled Adjustment of Inconsistent Bilateral Trade Data by SAKAMOTO. Normally, bilateral import values and export values do not correspond, because import values are recorded on c.i.f. tables, and export values are recorded on f.o.b. tables. This lack of correspondence in bilateral trade values is a major problem in the formulation of trade matrixes classified by industry, making an effective method of adjustment a necessity. This chapter takes up the "reliability index" developed by Gehlhar in the GTAP Project as a method of adjusting this inconsistent data, and provides examples of its use. Gehlhar's method of adjustment formulates a reliability index on the basis of the magnitude of the differences in value in reported bilateral trade data. In bilateral trade transactions, the trade values of the nation with the higher reliability index are judged more correct than those of the nation with the lower reliability index, and these are given the higher priority for use in calculations.

Chapter 3 presents the paper Estimation of Distributed Weights for Cross-referencing Commodity Classifications: Towards the Formulation of SITC-R1 Three-digit level Classification Codes by NODA. In this chapter, Noda formulates long-term time series data for Japanese exports using SITC-R1 three-digit product classification codes. Noda employs OECD statistical data, which is converted to the SITC-R1 three-digit codes using distributed weights calculated on the basis of the relationships of correspondence between the various SITC series. The least squares method with restrictions is utilized to calculate the distributed weights. The procedure employed in this chapter to convert SITC-R1 series data to the three-digit classification level does not calculate distributed weights directly from the correspondences between three-digit classification codes. Instead, the weights are calculated from the correspondences between four-digit classification codes, and data is converted to four-digit level transaction values. Three-digit classification codes are formulated by totaling these four-digit codes.

Calculation of Trade Price Indices by Commodity and Characteristics of Results: A Comparative Analysis of Taiwan, South Korea, the U.S. and Japan by KINOSHITA appears as Chapter 4. This paper looks at the problems encountered in formulating trade price indexes as deflators for use in analyzing relations of mutual trade and investment dependence. Kinoshita compares and examines the characteristics of unit price indices formulated using trade unit prices calculated from customs price and quantity and trade price indices calculated using shipping price or contract price. This chapter also compares the characteristics and problem points of the trade unit price indices formulated by the IDE using IO24 classifications with those of the trade price indices published by national and regional governments and central banks.

Chapter 5 presents Calculation of Intra-industry Trade Index: A Comparison of East Asia and the EU by FUKAO and ISHIDO. The authors point out the close relationship between vertical intra-industry trade and recent increasing foreign direct investment. Intra-industry trade is expanding with increasing vertical differentiation in the EU and Asian nations (including Japan), and it is therefore vital to formulate intra-industry trade indices to enable analysis. Fukao and Ishido consider methods of calculating intra-industry trade indices as trade indices in the broader sense, and examine the results of calculations made for Asian and EU nations. They present a definition of intra-industry trade indices and touch on their characteristics, but their discussion is not limited to the nature of trade data and the regions for which

they are conducting calculations, as they also offer stochastic considerations on the handling of inconsistent values in data.

In Chapter 6, Changes in East Asian Trade Structures and Analysis of Competitiveness, KAJIWARA utilizes data based on the IO24 classifications for East Asia (the Asian NIEs, the ASEAN 4, China and Japan) and the U.S. to conduct an analysis of changes in trade relations between 1970 and 2000, employing degree of trade linkage as a measure. In addition, this paper presents competitiveness analyses employing RCA and competitiveness indices. Trade analyses have traditionally been conducted utilizing product classifications, and therefore lose the industry perspective. This chapter attempts to correct this defect by employing long-term statistical data and multi-faceted trade analyses by industry using IO24 classifications.

Chapter 7, Trade Structures and Embodied Production Factors in Asian Countries and Regions, is jointly authored by KIYOTA and FUKAO. Since the 1980s, the growth rate of trade value has overtaken the growth rate of GDP by a wide margin in East Asian nations, and trade dependence has rapidly increased. Data on the makeup of import and export products is therefore valuable in understanding economic development in Asia. This chapter employs long-term (1962 to present) SITC-R1 trade data formulated by the IDE to analyze patterns of trade in Asia from the factor contents perspective. In analyzing production elements embodied in trade, Kiyota and Fukao utilize a method which does not take production elements introduced indirectly through intermediate input into consideration.

Application of Trade Indexes Studies: A Review by TANIGUCHI appears as Chapter 8. In this chapter, applications reviewed were mostly focused on the export price indexes. The purpose of the study of this review is to clarify the role of the international trade indices in the academic researches and policy formulations. The other indexes of trade indices, for example, the specialization ratio, RCA, or trade intensity index have also been eintroduced, as exampls of comparing the export pricing behavior of Japanese and the U.S. manufacturing showed one point and studies on the other indices: Terms of Trade and Intraindustry Trade indices.

Section 3, the materials section, is composed of "How to Read the Tables," Table 1, Table 2 and Table 3. Table 1 has the heading "Distributed Weights Calculated for Japanese Export Data" and presents the distributed weights for four-digit product codes utilized in Chapter 3 to enable conversion of product classifications in Japanese export data from SITC-R2 to SITC-R1 and from SITC-R3 to SITC-R2. Table 2 is headed "Unit Price Index Matrix," and shows the trade unit price indices formulated in Chapter 1 by countries and regions. Table 2 is divided into two halves: the first shows general unit price indices, and the second shows unit price indices calculated for twenty industry classifications from the twenty-four divisions of the IDE's 24 sector classification of Asian International Input-Output Tables (IO24). Table 3 is headed "Export RCA index based on IO24 Sector Classification for East Asian Countries and Regions, and USA".