A Compilation Method Improvement on China Multi-Regional IO Model-Based on 2007 China IO data Consistency Check

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Abstracts: State Information Center (SIC) has compiled China Multi-Regional Input-Output Models (CMRIO) for 1997, 2002 and 2007. The CMRIOs rely on provincial input-output data extensively. However, due to different statistical concept and handling the inter-regional flow data, there are some even very big inconsistencies among some industries in provincial input-output tables, which hampering the balancing and accuracy of CMRIO. Therefore, in this paper, towards compiling an update CMRIO, we discuss the current situation and reasons of inconsistency from the perspective of concept, structure and trade flow data among 2007 provincial input-output tables and national input-output table, then, propose the method to improve the quality of provincial input-output tables, so as to get the better accuracy of the CMRIO.

Keywords: China MRIO, China provincial IO, Inter-regional Trade, China IO Data Consistency

I. Data Consistency between National and Provincial Input-Output Tables

1.1 Inconsistency of intermediate inputs and the final demand items

We compare the inconsistencies between national IO and the provincial IOs of the non-zero items, which means that the data is zero in the national input-output table while the corresponding data in the provincial tables is not zero. According to the compilation method of China's national input-output table, intermediate inputs is calculated based on the industrial cost and fees from input-output survey, and the final demand is from gross domestic product (GDP) accounting based on expenditure method, including the rural consumption, urban consumption, government consumption, fixed assets, inventory, exports, imports, and error item. By comparing the 2007 national and provincial input-output tables, for intermediate inputs, the non-zero inconsistency of input sector mainly from mining of metal ores, mining and processing of nonmetal ores and other ores, and yet , the main source of non-zero inconsistency of use sectors are mining and processing of nonmetal ores and other ores, manufacture of textile wearing apparel, footwear, caps, leather, fur, feather and its products.

For final demand, the non-zero inconsistency primary showed in rural consumption, urban consumption, government consumption and fixed assets. Construction industry has the strongest inconsistency in rural consumption, the most number of inconsistent provinces up to 24, other inconsistent sectors are such as extraction of petroleum and natural gas, mining and processing of nonmetal ores and other ores. The strongest inconsistent sector of urban consumption is extraction of petroleum and natural gas, and public management and social organization, the number of inconsistent provinces is 20 and 16 respectively. For government consumption, the strongest inconsistent province is Gansu, the number of insistent sector is 10, and, the strongest inconsistent sector is public management and social organization, the number of insistent province is 17, then, for fixed assets, the strongest inconsistent province is Chongqin, GanSu and Qinghai ,the number of insistent sector are all 17.

1.2 Inconsistency of error item

Error inconsistency means the national table has error item while some provincial tables without error item. Nearly all sectors have basic error term, however, only several provincial tables contain error term, such as Liaoning, Jiangsu, Anhui, Shandong, Chongqing, Sichuan and Gansu.

1.3 Inconsistency of control totals and the structure

The inconsistency of control total means the big error between the sum of total output, value added, final demand and intermediate use of 30 provinces and the corresponding data of national input-output table. For example, the sum of total output and intermediate use of 30 provinces is lower than national 4.42 and 8.58 percent points respectively, while for the value added and final demand, the sum of 30 provinces is higher than national 4.22 and 52.34 percent points respectively. From the perspective of industry, sum of the most manufacturing's output of 30 provinces is lower than the output of national input-output table, and in these manufacturing, mining and processing of nonmetal ores and other ores owns the biggest error on output, the data of national table is higher than the sum of 30 provinces 26.58 percent points, meanwhile, for most of manufacturing , almost all sectors the sum of 30 provinces' value added and final demand is larger than the corresponding data in national data.

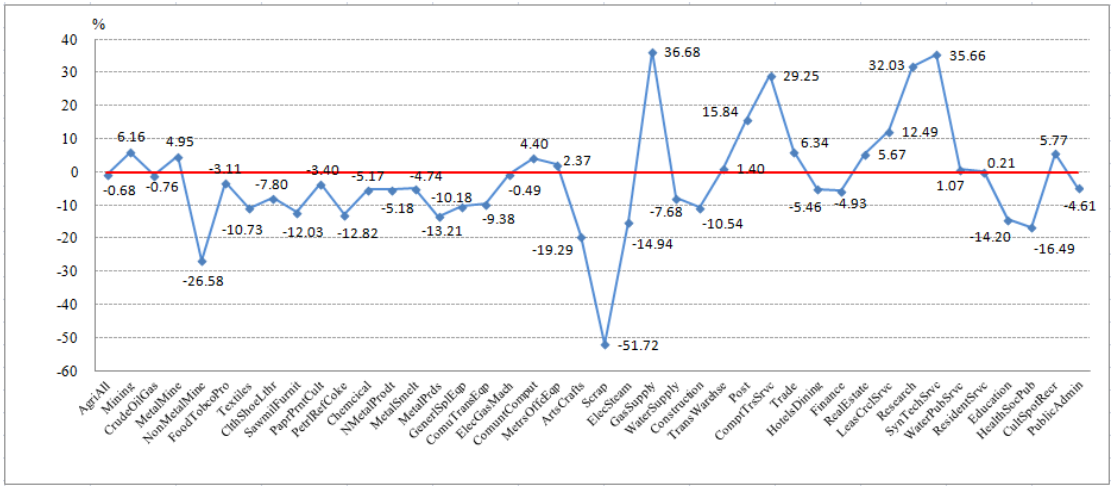

Fig.1 Inconsistency of Output

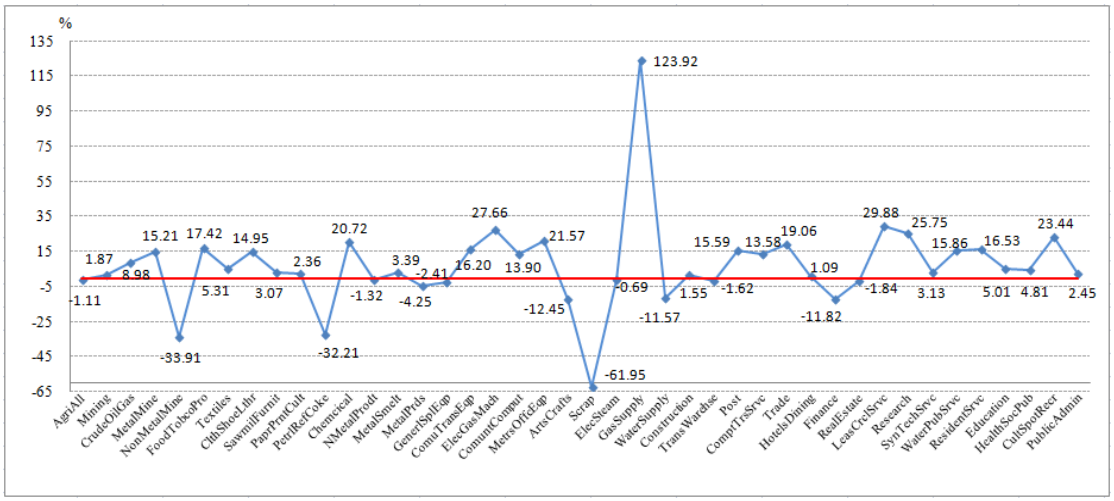

Fig.2 Inconsistency of Value-added

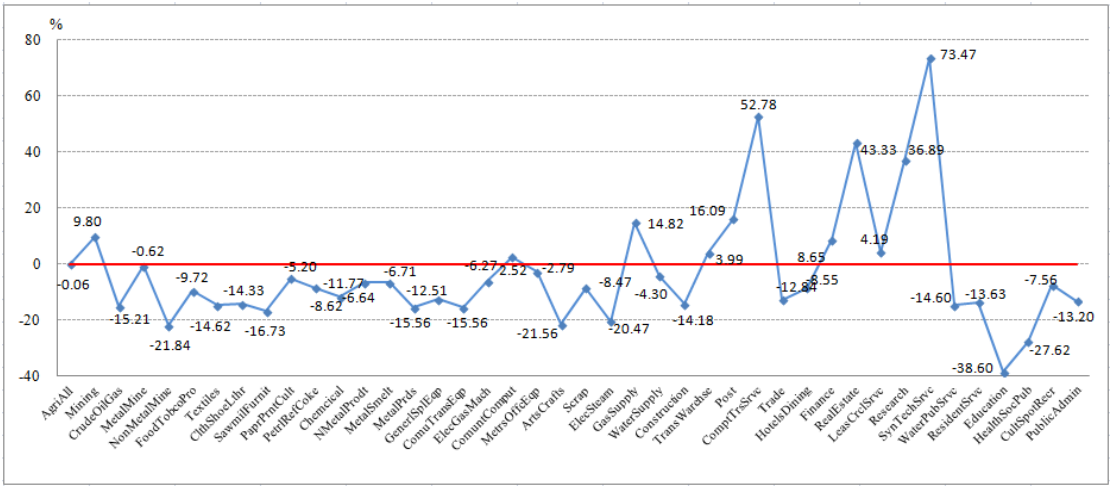

Fig.3 Inconsistency of Intermediate Input

1.4 Inconsistency of trade data

Trade data inconsistency is to point to the mismatch structure of inflow and outflow among 30 provinces and big errors of import and export between provincial and national input-output table caused by incomplete provincial trade data and inconsistent compilation method of import and export. Except import and export, the provincial input-output table extra needs to be complied inflow and outflow to show the trade linkage between one province and other domestic provinces. At present, according integrity degree of provincial trade data, the provincial input-output tables are divided into three categories: 4-column, 2-column and 1-column table. 4-column table means the provincial trade data contains inflows, outflows, imports and exports respectively, and 20 provincical tables belong to this category; 2-column table means the provincial trade data contains “inflow+import” and “outflow+export”, and 9 provincal tables belong to this category; then,1-column table means only net outflow or net inflow contained in the provincial trade data, and only one provincial table belongs to this. Therefore, export and import of 2-column and 1-column table are needed to be estimated by using customs trade data to get 4-column trade data, however, as the inconsistent compilation method, data source and price between national and provincial table, many other inconsistent problems are needed to be solved.

1.4.1 Inconsistency of import and export compilation method

Firstly, according to SNA2008 standard, for the "processing and assembling from imported materials ", only the cost can be accounted, the import and export are needed to be deduct when compiling the import and export vectors. However, most of the provinces don’t abide this principle. Also, as provincial table was compiled by each province, the price and industry classification are not exactly matched between national and provincial tables. The last but not least, for the incomplete trade data of provincial table, import and export are needed to estimated to get 4-column table for many provinces, so the different data source is another cause of inconsistency.

1.4.2 Inconsistency of trade amount

Export and import inconsistency means the sum of import and export of 30 provinces are not

equal national import and export. The total import and export of 30 provinces are lower than national import 12.5 and 19.8 percent points respectively. Inflow and outflow inconsistency refers to the inflow isn't equal to outflow viewed the provinces as a whole, for 2007 provincial tables, outflow is 510.1 billion less then inflow.

1.4.3 Inconsistency of trade data and using structure

In the process of compiling multi-regional input-output table, the import and inflow are needed to be deducted from intermediate and final use respectively so as to estimate provincial import-inflow non-competitive input-output tables firstly, however, for some provinces or sectors, there appears negative data not only in the intermediate use or final use matrix, but also in the total intermediate use or final use for some, which means product capacity is not sufficient to meet provincial demand by running out all imported and inflow products, which is not consistent with the actual, this occurs mainly in the following situations:

(1) Eastern major provinces of economy and trade-such as Shanghai, Jiangsu, Zhejiang, Fujian, Guangdong and Hainan, have a large number of import, export, inflow and outflow with relative big trade scale. The mainly sectors are manufacture of manufacture of communication equipment, computer and other, manufacture of measuring instrument and machinery for cultural activity and office work, manufacture of general purpose and special purpose machinery.

(2) Inland provinces –such as Chongqing, Yunnan and Qinghai, have certain export or outflow with relative small provincial production scale, but the provincial intermediate use and final use mainly relay on import and inflow.

II. The reasons of the inconsistency between national and provincial date

First, Lacking unified concepts between national and provincial input-output tables

It is fuzzy about on input-output table structure, the concept 、accounting method、accounting scope of each term of the table in the process of compiling provincial input-output tables. Under the principle of national input-output complication method, intermediate input refers to the value of all non-permanent assets goods and services used in the process of manufacture or provide goods and services by resident units, which is accounted with different scope from agricultural sector、industrial sector、construction, wholesale and retail, transportation, warehousing and postal, accommodation and catering, information transmission, software and information technology services, finance, real estate and leasing and business services and other services. The different accounting scope in the process of compiling provincial input-output tables is one of the reasons to cause the inconsistency. Besides, also, under the principle of national input-output complication method, the error term should be exist, the misunderstanding of the basic structure of IO tables for some provinces is another reason to induce the above inconsistency.

Second, Lack of official data source of interregional trade

Inflow and outflow data of China mainly come from "Industrial Enterprises Inflows and Outflows Survey", launched by National Bureau of Statistics. The survey contains where the industrial products firstly sold out and the raw materials come from, the national inflow and outflow can be calculated by expanding the range based on above survey data. As the survey data doesn't distinguished by destination and source for each sector on provincial level and with the

small amount of survey data, disequilibrium is also exist, which caused the inconsistency between inflow and outflow.

Third, Transit trade expand the scale of import, export, inflow and outflow of each province, causing the inconsistency between trade data and using structure.

III. Suggestions on the improvements

As the inconsistency in data concept、structure and trade date between national and provincial input-output tables, several suggestions may be adopted to improve the trade date quality and establishment method of provincial table.

1、More detailed national input-output table should be compiled, which provides the data base and specification for provincial input-output tables. Firstly, concepts and basic input and use structure of each industry must be defined clearly in national table so as to keep consistent between national table and provincial tables; then, more detailed industry classification of national table can providing more information for compiling provincial tables.

2、Import and export of each province should be compiled by uniform staffing methodology. For the first, the “according to domestic destinations, supply of goods” trade data, including service trade from customs should be adopted to compile provincial tables; secondly, uniform comparison between customs data classification and input-output sector classification should be adopted; then, the same processing method in customer's material processing also should be adopted in provincial import and export data so as to consistent with national trade data.

3、Strengthening and refining the survey of industrial products firstly sold out and the raw materials come from. Inflow, outflow and the balance mechanism of each province can be compiled by National Bureau of Statistics, so as to improve the quality of provincial table and the consistency between national and provincial tables.

4、Distinguish the entrepot trade and normal trade to get total entrepot trade data by detailed industrial products firstly sold out survey. Under the condition of lacking trade and entrepot trade data in national level, the entrepot trade should be distinguished in the provincial tables and make the balance for each province. When trade data do not consistent with using the structure, entrepot trade should be estimated by certain proportion according to whether the output is zero of inconsistent industry, so as to get the real import and inflow of each province and solve the inconsistency between trade data and using structure.

5、If possible, import-inflow no competitive input-output tables of each province should be compiled.

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