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ESA'95 & the Practice: Hungarian IOT, 1998

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Abstract

The ESA'95 describes the output in a rather accurate way, that is what the ready made IOT should be like, but it does not give a precise methodology to know what data should we start from and which steps along we reach the required target. It is clear that there exist several different solutions depending on the data at disposal.

The aim of this paper is to present the I/O developing tasks in Hungary, and the efforts made by the Hungarian Central Statistical Office in order to fulfil the ESA'95 recommendations compiling the next benchmark IOT for 1998 based on the commodity flow system.

Introduction

The compilation of input-output tables (IOTs) has a long-standing tradition in Hungary. The first Hungarian IOT was compiled for the year 1957. Since that we have done it for all years. Approximately every five years we compile a so-called benchmark IOT based on completely renewed data base. The average size of these IOTs is about 90 times 90 (branches and products). Between two benchmark IOTs (or benchmark years) we make simplified small tables with about 20 groups of branches and products.

In the past, IOTs were compiled as an extension to the national accounts, rather than an integrated part of them, without having any role in the construction of GDP. The IOTs have served, first of all, analytical and modelling purposes.

Last year there was a big turning-point in our work. The most important aims were the followings:

- the acceptance of the requirement of the statistical harmonization: the IOTs in Hungary should be prepared according to the ESA'95 recommendations;
- the input-output framework should be integrated into the system of the Hungarian National Accounts to increase the reliability of the annual GDP calculations;
- to meet the needs of a wide range of users (especially: researchers, economic analyses).

ESA'95: a new conception

Having studied the ESA'95 and the international (Dutch, English, German, Norwegian) practices of compiling national accounts we have come to the conclusion that there was an important change in ESA'95 in respect of input-output framework. The emphasis has been shifted from the symmetric input-output tables to the Supply

and Use tables. S&U tables are linked with the sector accounts and various basic statistics by product and industry. This pair of tables is very strong statistical and analytical instrument: in the near future we are going to use our aggregated S&U tables in calculations of preliminary national accounts figures, as well, generally considered as a reliable way of calculating GDP figures. The symmetric input-output table have no such direct links with the basic statistics, but it could be prepared by transformation of the S&U tables.

At present we are working on the S&U tables at current prices only. The next step will be the construction and balance of S&U tables simultaneously at current and constant prices.

Compilation of the S&U tables is based on the commodity flow system

We compile first time a detailed set of S&U tables establishing the common base of the system of National Accounts and the IOTs as well. We have worked out a list of nearly 660 commodities (goods and services) representing the whole economy. In this list eight-digit numbers are used for the identification of the National Accounts commodities. It must have flexibility because of the chance of changes in the commodity classifications in the basic statistics. We have to update it annually. The main concept by the separating of the groups of goods and services was their typical kind of use. For example: intermediate consumption, investment, final consumption of households. In order to be able to connect different nomenclatures a master file has been made (so-called BRIDGE) which translates these nomenclatures into the list of the National Accounts commodities. The BRIDGE links the Hungarian Domestic Product Classification to the Combined Nomenclature of the external trade statistics on the level of as many as 3300 baskets (groups of commodities). At this work we had to obey also the expectation that the National Accounts commodities should be able to get aggregated into the CPA nomenclature at two-digit level according to the ESA'95 prescription.

The S&U tables describe in more detail the production process (cost structure, income generated, employment) and the flows of goods and services (output, imports, exports, intermediate and final consumption, capital formation).

The supply side of the system is contained in a matrix of the size about 660 commodities by about 250 branches for domestic output. Import goods are aggregated to the national accounts commodities as well. Import of services are taken from the balance of payments statistics, but much more detail is needed in our system. These services will be put on the right place along the balancing. The Supply table contains the gross output and the imports at basic values.

The Use table contains the intermediate and primary inputs and the items of the final demands at purchasers' values in the same breakdown as the Supply table.

During the identification of the items of the final demands we have noticed several times that they do not harmonize with the corresponding source data. These gaps must be corrected during the balancing by systematic checking.

There are two types of identities between the Supply and Use tables.

- **budget identity**: identity by industry, that means: Output by industry = Input by industry
  and for each industry: Output = Intermediate consumption + Value added;
- **transaction identity**: identity by product, that means: Total supply by product = Total use by product
  and for each product: Output + Imports = Intermediate consumption + Final consumption expenditure + Gross capital formation + Exports.

These identities are used to balance the available information from primary statistics. After filling up with data, in the Supply table the flows of goods and services are valued at basic prices and in the Use table at purchasers' prices. In order to attain identities between Supply and Use, there is needed to make a transition between the two valuation (price) systems.

The transition from Supply and Use at basic prices to purchasers' prices involves reallocating trade and transport margins; adding taxes on products (except deductible VAT) deducting subsidies on products. This transition is an important step of the balancing process.

After the consistency checking, completing and correcting the data at disposal we have fulfilled the Supply and Use tables. Supply and Use tables are first calculated independently.

S&U tables filled with primary data are generally inconsistent. The elimination of the inconsistencies is the balancing process. This balancing means a process of searching, finding and correcting errors in the primary data. At the balancing of the data of Supply and Use we will take into account that the data on the supply side are the more reliable ones - but not in all cases.

Basic data sources

In 1998 several changes happened in Hungary to the statistical data collection system benefiting the introduction of the commodity flow. (Partly these changes played a role in the acceptance of the ESA'95 requirements, too.) For the compilation of the IOT we make us of all available information, even if it seems to be far from the traditional input data of the IOT. For example: the census data of the entrepreneurs (1997), and the data of the retail trade sensus (1996). Use of the administrative records has a great importance, as well. If there are nor available data based on any statistical survey, neither from the administrative records, we organise expert's estimations co-operating with different researchers. (E.g.: for the intermediate consumption structure of financial sector, and for the trade margins broken down by products.)

Data from different sources will be „confronted" with each other: we perform cross-checking and validity checking, gross them up and revise them in order to have a data base adequate to the macroeconomic level.

By the linking of the nomenclatures applied in different areas we have identified as many as 660 commodity groups for the system which can be aggregated at two-digit-level of CPA properly.

The choice of the observation unit is also a very important question. For few hundred enterprises we have introduced the observations according to the kind of activity units. For at this level only data of production values stand at our disposal (the structure of the material input refers to the enterprises), first of all we aggregate the data at industrial level, after this we break them down into kind of activity units via estimations.

The compilation of IOTs based on the commodity flow system needs a large amount of data, therefore some modifications to match this requirement have been performed in the system of Hungarian statistical data collection for l998, for example:

- in the area of the structural business statistics;
- in the observation of the composition of investments;
- in the data collection of the intermediate consumption of goods.

At the same time there were some small methodological changes in Hungarian statistics, which were important concerning the data base of IOT, as well.

The activity classification was close to the international system (NACE) but not the same. It has been changed to the NACE rev 1. completely on January 1, 1998. In 1998 an important step has started towards harmonizing business statistics to the international standards, as well. The similar process has been launched on the field of investment- and labour statistics. At the same time in the product statistics, we started the full adaptation of PRODCOM requirements by extending the scope of data providers and product registers.

For the compilation of the Supply and Use tables we use the data of more than 100 statistical surveys. These data are supplemented by information taken from administrative records (for example tax declarations). To make up the emerging lack of data sometimes we use estimations of expert's. For example: the substitution of the missing data of the matrix of the transport margins, the structure of the intermediate use of the financial institutes, etc.

Data sources of the Supply matrix

The sources of the main summary data are the annual and quarterly structural business statistics surveys. These summary data of the annual output by industries are broken down by activity.

The structural business surveys concern the enterprises with more than 4 employees. There are quarterly data on the level of kind of activity units of the largest enterprises (700 KAU of 140 enterprises), as recommanded in the ESA'95, but now this part of the survey yet can not be used, because the reliability of these data seems yet not to be sufficient. First of all we treat the data at industrial level, then we will break down the data of enterprises into the kinds of activity units according to ESA'95 requirements. Finally we will balance these data via estimations.

The most detailed information on goods are about the industry (mining and manufacturing and eletricity, gas and water). The observed unit of the industry, for the time being, is the enterprise. The annual survey of industrial statistics is a full-scope survey covering the industrial enterprises with more than 19 (in some industrial branchies over 9 or 4) employees and the non-industrial enterprises having industrial local unit marked out for this survey. The questionnaire contains information on the production (in natural unit), on total sale (in terms of natural unit and of value) and on export and domestic sale (in terms of value). Enterprises have to report data of about 8100 products and 300 services according to the CPA.

Concerning the enterprises registered as construction the annual report refers to the enterprises having at least 10 employees, the interim representative report refers to the enterprises having at least 5 and not more than 9 employees, and outside of the construction branch the meaningful construction activity is observed. The construction activity is broken down by the so called main groups of buildings.

The data collection of the agriculture has a commodity aspect and is extended to the farms and organisations dealing with agricultural activity. The experts of agricultural statistics supply us with aggregated production data from the commodity balances.

There are introduced several kind of data collections for the service branches, too. These data can be used only for estimations because, for example, the information on the retail trade contains the whole turnover, instead of the respective margin values. There are even service branches (for example post and telecommunication) yielding information mainly in natural terms.

Data concerning imports of goods are based on customs declarations. Foreign trade in services is derived from balance of payments statistics complemented by a quarterly enterprise survey conducted by the Ministry of Economic Affairs. The nomenclature used is the Hungarian Combined Nomenclature corresponding to the European version of the CN (on 8-digit level). It contains approximately 13000 headings.

Data sources of the Use matrix

The structural business survey contains the intermediate consumption, as well, but without structural breakdown. The structural details come from other questionnaires. There are two sorts of questionnaires to collect the data of inputs:

- The more detailed questionnaire is fit for the enterprises with more than 300 employees. It has rows for 220 commodities and 31 services.
- The other one is for the smaller enterprises. This second questionnaire has 25 rows for product aggregates.

Concerning the government sector the input data are gained from the annual budgetary reports which contains the material costs in detail of 75 aggregates. We have performed the ranging of this into commodity flow rows and its identifying according to the CPA of 2 digits. It makes a serious problem that the structure stood at disposal as detailed by insitutes but the accounting of the government sector is realised by functional tasks. We have information about the numeric total of the material expenditures of the functional tasks. Finally, the structure of intermediate

consumption of government sector is compiled by a mathematical estimation process.

For the financial institutions there is not any data of intermediate consumption broken down by its structure, therefore we use expert's estimations.

Energy statistical data are contained in the energy balance made by the Hungarian Energy Information Agency and we make use of it.

The expenditure data of the household consumption come from the household budget survey (HBS) and from the retail trade survey. The retail trade survey provides data on total trade and a breakdown by the kind of activity. There is also a quarterly survey, which provides a commodity breakdown. The HBS is an observation covering the quarter per thousand of private households. Here is used a classification which approximates the COICOP and will be made conformable to it in the near future. Before using the HBS data, some adjustments and corrections are needed, because the HBS serves different aims in general, and is usually not designed for macro estimates.

The data of government consumption expenditures are compiled by the experts of National Accounts which means the estimation of the amounts of them and their distribution into the sum of the social transfers in kind from government and the collective consumption.

The main data sources for the estimation of the gross fixed capital formation (GFCF) are the annual and quarterly investment surveys. For the year 1998 there were created a new questionnaire containing the breakdown of building investments by building groups and the breakdown of the machines investments by kind of machines (classified by the CPA) – separated the technological and transport equipments. The sources of the export data are the custom declarations.

Data sources of the margin matrix

Compiling the margin matrices is perhaps the most difficult task, because of lack of sufficient information. Therefore to fulfil the data requirements of margin tables we needed to organise the most of experts' estimations. Nevertheless, we have some statistical observations concerning even this part of our work. These are:

- The complete retail trade census in 1996 covering 60 commodities,
- Survey on transport tariffs of goods by type of them and broken down by kind of activities and by the transport directions. There is a significant lack of information concerning the value and structure of the road way transport activity. There were made estimations to evaluate the average rates of roadway transport charges.
- A quarterly and representative survey on wholesale trade organised by the Ministry of Economic Affairs.
- Concerning the taxes and subsidies there are rates of tax and information derived from the Tax Office and the Ministry of Finance.

Problems and their solutions

The problems discovered in the data preparing process to fill up the Supply and Use tables can be summarised in the follows:

- To make up for the lack of the supply and use data we have organised experts' estimations: intermediate consumption structure of financial sector; average trade and transport margins broken down by type of goods and directions of their distribution.
- We have found significant discrepiancies between the data with the same content but from different data sources on the level of enterprises. That means, there can be inconsistencies in the filling up of different questionnaires by a certain enterprise because of the conceptual differences of the bookkeeping system from the statistical concepts. (Costs of purchased goods many times are recorded as costs of used materials, or the material costs of the processing transactions are recorded by different way on the enterprise level: some enterprises accounts for the processing of goods at gross level, other ones at net level.) We have to bring these data in compliance with ESA'95 definitions.
- Failures in the data which occured in the reporting units, for example: mistakes with decimal points, using a quite different classification, no data on other taxes on products. We have performed the corrections quite securely partly through queries of the enterprises by phone, partly by making use of the interdependencies of the data. So sometimes the reporting units were involved to check their data again. In some cases also new data sources – the homepages of the greater firms on Internet – were used for correcting the wrong data.
- We have problems with the exhaustiveness of the data sources. As mentioned above the most of the statistical surveys do not cover the performance of the individual entrepreneurs and enterprises with less then 5 employees. We solved this problem using an estimation prepared by the Department of National Accounts and based on the tax reports.
- Estimations of the different statistical indicators – of use or supply type – are made independently from each other by the branch statisticians. The connection of these estimated data and their fitting in a complex system of branches causes the most serious problems. The solution of this is managed by the balancing process.The connection of different estimations or elaboration of an extra estimation – adequate for the I/O purposes – demands a close co-operation between the macroeconomic experts and the experts of the branch statistics.
- There are quite a lot of other problems we have not mentioned above, as well. Solution of them needs great experiences and creativity.

Although we are still in the middle of our work, our results reached until now render a meaningful aid to our other departments advising a better way of data collections in the future, their checking and corrections suggested by the nature, structure and numerical content of our tables.

To cope with our task we have computerized our work in a new way. The other lecture from Hungary will demonstrate this.

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