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The Experience of Product-to-Product IO-Matrices Calculation

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Problem Description

- Each industry produces a number of products as well as its primary commodity;
- The IO-matrices include two product-by-industry parts: Use and Make;
- The task is to compute the product-by-product IO-matrix by reducing the value of secondary output.

Possible Solutions

- The simplest approach
  - Application of RAS-method to Use-matrix;
- The SNA approach
  - Industry Technology Assumption;
  - Commodity Technology Assumption;
- INFORUM approach
  - Almon's method.

Project Steps

- Current methods’ overview;
- Trial calculations;
- Choosing the most appropriate method;
- Software development.

Data and software used

- The official Use and Make 25-sectoral matrices for 1998-2001 years;
- INFORUM freeware (unit `bump.h`) as well as our own soft developed with C++.

The objective was *computing a time row of product-to-product IO-matrices with the most appropriate method.*

The simplest approach

We can just apply the simple RAS method to the Use matrix:

$$IO = ras(Use, product\_out, product\_out)$$

Advantages: the quick convergence of RAS method when being applied to small matrices which content not a very large amount of secondary products

Shortcomings: lack of economic sense

The SNA approach

- Industry Technology Assumption (ITA)

Advantages: a simple way to clear "bad" (singular, rectangular) Use & Make matrices of secondary products;
Shortcomings: the economic sense is very doubtful

- Commodity Technology Assumption (CTA)

Advantages: the most acceptable SNA method;
Shortcomings: often leads to unexpected results (negative IO-coefficients) so needs to be improved.

INFORUM Approach

This is a CTA-method modified by C. Almon:

- No negative values;
- Clear economic sense;
- Also it can be useful for Use-matrix adjusting.

The problem of secondary products

- Most industries of 25-sectoral model have about 3% of secondary products but some of them has considerable value of secondary output (like some fuel producing industries which have more than 20% of secondary commodities).

Benchmark overview

- By 2005 the Russian Statistics Agency (ROSSTAT) starts working with a new ***kind of activity*** classification → there can appear some troubles with new IO-matrices;
- Russian industries are too aggregated → they don’t reflect the real technology process;
- IO-matrices are published with a time lag → now we have only 2001 year table.

Conclusions

- Because of high aggregation of industries all the methods described above gave approximately the same result;
- Taking in the account the change of classification in the nearest future as well as expected increase of industry numbers we consider the Almon's method to be the most appropriate way of IO-matrices making.

Plans for the future research

- Estimating time series of IO-matrices in constant prices;
- Increasing the number of industries;
- Refreshing the database of the Russian Interindustry Model.