Inter-Sector Inter-Region Model for Russian Economy: Methodology and Application

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The paper presented is intended to analyze an approach to a long-term inter-sector and inter-regional economic analysis as based on an optimization model. This approach was developed in IEIE SB RAS and resulted in several directions of application. One of them is investigation of interactions between a national economy and its energy production segment. The model being discussed includes input-output tables for six regions of Russian economy supplemented with model blocks for interregional transportations. It includes a natural block of energy production, processing and transportation. The last version of this model combines 45 products of different economic sectors including 8 ones of an energy sector (rough oil, gas and coal, two kinds of petroleum products, coal processing, electricity and heat), and 6 Russian macro-regions; it is a composition of two sub-models for 2 time periods: 2008-2020 and 2021-2030. Each of the sub-models treats time changes in simplified manner â€“ it means that all the variables are defined for the last year of the period and the variables of the basic year are fixed as exogenous ones. The dynamics of investments into fixed capital is treated as non-linear functions being adapted with the help of linearization techniques.
Modern versions of OMMM are based on the following statistical data:
â€¢ Aggregated Input-Output Tables for the Russian national economy for each year from 1995 up to 2004 which include 20 sector products;
â€¢ tables of goods and services consumed in Russia (in consumer prices of next year) which include 20 sector products,
â€¢ Russian National Input-Output Table for 1995 which includes more than 100 sector products, and
â€¢ other statistics provided by the Russian Statistics (ROSSTAT).

There are certain difficulty in calculating regional input-output tables. Unfortunately, neither ROSSTAT, nor regional statistical bodies have started with issue such data since the beginning of the economic reforms, at least in regularly and in complete patterns. That is why we, since the end of 1980s, have to adjust regional differences of input coefficients to update current regional IO tables. For this purpose we apply certain kinds of RAS methods.
A basic advantage of the OMMM-Energy is a combination of different approaches such as the input-output, inter-regional and energy balances. This allows evaluating the complex effects and efficiencies of the policy measures undertaken in the spheres of production, processing and consumption of energy. Previously, the model was applied to evaluating economic consequences of the:
â€¢ concentration of energy-intensive productions and gasification in the South Siberia regions;
â€¢ fast development of nuclear energy in the national economy;
â€¢ a reduction of energy intensity of production in the national economy;
â€¢ wide application of heat pumps technologies in the different regions of the national economy;
â€¢ efficiency of using and spreading RES technologies in different regions of Russian economy;
â€¢ forcing of Siberian gas and coal out from international enery markets.
We consider the novelty of the paper presented as, first, critical comparison of analytical strength of the model of the type we deal to analytical strength and options of MRIO analysis. Secondly, we apply the model to evaluate economic consequences and efficiency of spreading both sorption air conditioning and sorption cooling technologies which are essentially less demanded for energy use

with respect to traditional compression engines but much more capital intensive.