

## Dynamic Input-Output Model of Russian Economy with Human Capital Block.

Topic: (4.6) Special Session: Input-output Approach and Impacts of Economic Policy in the Emerging Markets (2)

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The research question

The accumulation of human capital is an important factor of economic growth. It seems to be useful to include «human capital» as a factor of a macroeconomic model. Most of the models usually distinguish labor force by the levels of education, while some of the factors remain unaccounted. Among them are health status and culture development level, which also influence on labor productivity. Inclusion of the human capital block to the dynamic input-output model can help to make it more reliable for economic development forecasting.

The method used

The basic DIOM, which is developed in this paper, was first described in [1]. Later it has been developed in several directions including a version of the model with fuzzy parameters [2].

The model includes  $n$  sectors. Among them  $1, \dots, k$  can be defined as asset-building sectors (production of machines, equipment, structures),  $k+1, \dots, l$  as sectors which produce human capital,  $l+1, \dots, m$  as non-asset-building sectors in the first subdivision (production of raw materials and intermediate services) and  $m+1, \dots, n$  as non-asset-building sectors in the second subdivision (production of consumer goods and consumer services for households).

The model uses the following parameters:

$m$  - the number of the first subdivision sectors ( $m < n$ );

$k$  - the number of asset-building sectors;

$l$  - the number of human capital investment types;

$T$  - years of the forecast period.

The basic model is extended with additional equations that allows to model human capital reproduction.

1. The equation that describes the formation of human capital of type  $i$  put in service in each sector  $j$  in period  $t$  as a result of investment in human capital in previous years.
2. The equation that describes the relationship of investment in human capital type  $i$  in sector  $j$  at period  $t$  with the output of students for the period of time  $t$
3. Recurrent equation for re-calculating of «construction-in-progress» of human capital of type  $i$  in sector  $j$  (i.e. people who continue their education or medical treatment) for every period  $t$ .
4. The equation describing the dynamics of the human capital value of each type  $i$  in each industry  $j$  in each year of the forecasting period  $t$ .
5. Constraint which characterizes the fact that in each year of the forecast period  $t$  in the economy cannot be used the human capital more than the value of its available.

The data used

Forecast calculation using the dynamic input-output model with a block of human capital is carried out using statistics of the Russian economy.

The novelty of the research

In this paper, in the construction of the block of human capital in a dynamic input-output model uses

the idea of human capital modeling, by analogy with the modeling of fixed assets reproduction. In addition, currently not developed dynamic input-output models of the Russian economy, which include a block of human capital.

## References

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