

## **Input-Output Model for the Ivanovo Region of Russia**

### Background

The Ivanovo region (IR) is one of the most problematic regions of Russia. It is enough to say, that the share of its gross regional product (GRP) in the GDP of the Russian Federation has decreased from 1.04% in 1990 to 0.28% in 2000, and the share of budget transfers exceeds 40 % of the regional budget (including off-budget funds).

These poor conditions have induced the regional administration to think of the possibilities to overcome the crisis and to seek for the ways of economic development in the region in future. Moreover, some Administration officials were interested in a possibility of an economic leap up to the level of such Western European countries as Portugal and Spain during a foreseeable period of about 20 years (it means achieving a per-capita GRP of about USD 12,000). In this context, the Ivanovo regional administration applied to the Institute of Economic Forecasting of Russian Academy of Sciences (IEF RAS) with a request to assist in developing a long-term strategy of economic growth and to perform forecasting.

The strategy for the Ivanovo region's mid- and long-term economic development, requested by the Administration, should comprise the following:

- analysis of the current economic situation in the region;
- estimation of the potential of the economic growth and of the general possibility to pursue a breakthrough development scenario in Ivanovo region;
- formation of long-term objectives (image of the future);
- formulating a development concept targeted at achieving the strategic goals;
- proposals for developing particular sectors of the Ivanovo region's economy;
- establishing development scenarios for the Ivanovo region in coordination with the economic development scenarios for Russia as a whole for the period till 2020.

## Problems

The main problem we have faced in this project was that the regional administration wished for impossible things to some extent. Really, for the Ivanovo region to achieve within a period of 20 years a per capita GDP levels equal to that of Western European countries, its annual growth rates should exceed 16%. (For information, the per capita GDP in Ivanovo region only slightly exceeded the ruble equivalent of USD 600). However, for us it was interesting in itself whether this task could have any feasible solution. It is necessary to mention that setting such ambitious targets by the regional administration was not in the last place explained by the preparation for regional elections.

The second problem was a need for a regional input-output model be able to perform projections by sectors. We did not have such a model.

The third problem was extremely poor regional statistics. Regional accounts and Input-Output Tables have not yet been compiled by the regional statistical offices.

The fourth problem, was rather tough time constraints for the study. We were given only 5 months.

## Solutions

### *1. Strategy*

Ivanovo region has no deposits of oil, gas, diamonds or else. Its only resource is labor force, mostly female. The main specialization of the region is textile industry which was established in the Soviet time. Ivanovo region produces cotton textiles, and their output comprises over 60% of domestic output of these products. But if within the Soviet Union, Ivanovo manufacturers used domestically produced raw cotton, mostly from Uzbekistan, now all raw materials should be imported. Production costs are high, fixed assets have been worn out. Russian textiles encounter sharp competition with imported textiles even on the domestic market.

Certainly it is difficult to fulfill and even to propose anything radical in this situation. Nevertheless, we have tried to draw in all arguments in favor of a general possibility to achieve a much higher level of economic development in Ivanovo region in the long-term.

First, we assumed that, within next 20 years in Russia, the purchasing-power parity and currency exchange rate will be much nearer. According to our estimates, the real ruble exchange rate will increase at least two times. Nevertheless, even in view of this factor, the requirements for the regional economic dynamics remain extremely high – annual GRP growth rate must be at a level of 12 %.

In this connection, the task has been formulated to assess the internal factors of the economic growth in the Ivanovo region.

After reviewing the economic situation in the region, the following conclusions were made:

- there are hidden incomes of a large scale which are not recorded by statistical observation (according to our estimates, hidden income comprises half of the annual volume of wages and salaries).
- rate of tax collection is low (approximately 65%).
- capital flight is very high (between 50 and 100 million US dollars per year).

However, it was demonstrated already by the preliminary computations that even mobilizing these and some other resources would not allow achieving the desirable rates of growth.

In this connection, it was suggested to strengthen the export orientation of the regional economy making exports the main factor of the growth rates acceleration of the economic dynamics. Here, the most important is to upgrade the quality of products and, in such a way, to improve the proportions of exchange. For example, the world and domestic prices for some goods manufactured by the local textile and sewing industries, in particular, linen cloths, differ by a factor of ten.

After the general approaches have been formulated, the main difficulties remained with construction of IO tables and development of IO model.

## *2. Statistics*

As it is known, if any data are absent, it should be prepared.

Thanks to the assistance of the regional administration, we managed to collect much data for Ivanovo region, including primary statistics from the majority of large enterprises. It has allowed us to compile our variants of the regional accounts similar to

the national accounts. More over, the IO tables for 1990-1999 for the region were constructed in current and constant prices.

We used the following procedure for constructing IO tables. Firstly, IO tables in constant prices were constructed, and then, using sectoral deflators and basing on the sectoral statistical data, IO tables in current prices were obtained. The main difficulty in constructing IO tables in constant prices was estimating the technology matrix (A-matrix). Last official A-matrix, where technology coefficients had some relation to the Ivanovo region, was the A-matrix for the Central economic region of Russia for 1987. We had no alternative but to use it. We extrapolated the A-matrix by imposing the dynamics of the technology coefficients estimated for Russia as a whole for 1987-1999. In addition, some coefficients were adjusted on the basis of the available sectoral data on the structure of input in the Ivanovo region.

For the purpose of compatibility, the sector structure of the regional IO tables was chosen similar to the IO tables for the whole Russia.

### *3. Model*

An important factor affecting the approach to constructing an economic model for a region in Russia is sizes of regions. Russia comprises 89 regions, which means that each of them is rather small in comparison with the whole country. This implies, in particular, that the macroeconomic conditions and macroeconomic policy of the federal level are determinative for regions. The economic processes in separate regions are by 70 to 90% determined by what occurs in Russia as a whole.

It means, that calculations on the basis of the IO model for the Ivanovo region should be coordinated with calculations carried out on the basis of IO model for the whole Russia. A perfect solution here might be to make the model for Ivanovo region a constituent part of the larger model for the Russian Federation, where direct relations and feedbacks between the two models are introduced.

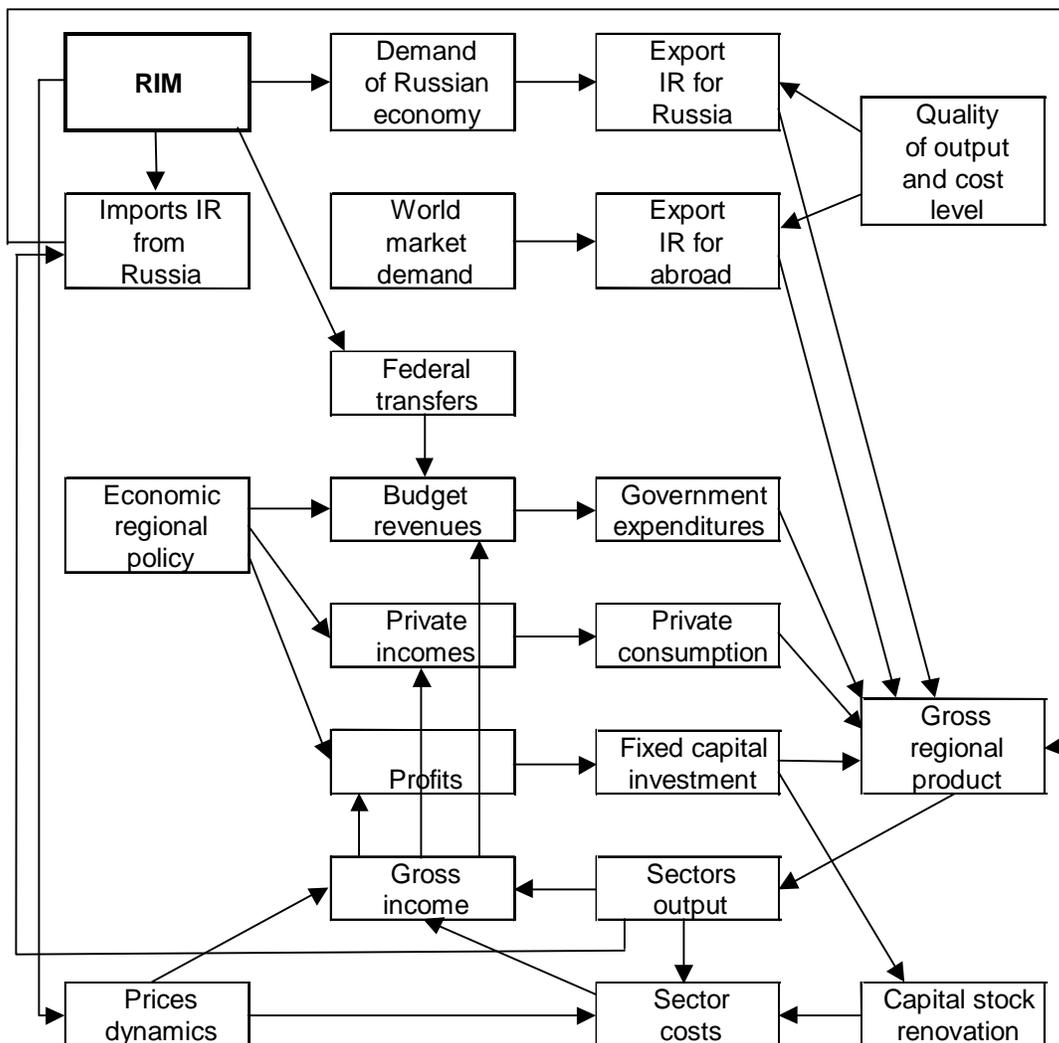
However, given the complexity of the task and the fact that the impact of the Ivanovo region on the Russian economy is negligible compared with the macroeconomic impact on the region, at this stage, we implement a scheme to evaluate the influence of only one side, i.e. Russia, on Ivanovo region.

To better understand the results and the nature of for the projections for Ivanovo region, let us look on the key interactions that determine the influence of the Russian economy on the regional economy and are represented in the IO model.

First, the volume of regional exports which is consumed in Russia depends on the respective demand of the Russian market.

Second, the dynamics of the regional prices in the model is directly dependent on the price dynamics in the Russian economy.

*Scheme 1*



Third, transfers, both social and from the Federal Fund for Support of Regions, are largely determined by the federal budget revenues. Besides, sizes of transfers depend on some indicators of the regional economic development, for example they, to a large extent, depend on the ratio of the average per-capita income in Ivanovo region and in Russia as a whole.

The interaction of the Russian model (RIM) with the model for the Ivanovo region is shown at scheme 1.

Similar to the RIM, in the Ivanovo model supply and use of products in constant prices are estimated on the basis of the static IO model. However, price estimates for Ivanovo region are obtained not on the basis of the regional price model but are calculated with the account for the price situation in the Russian economy as a whole.

Prices, production costs, and output volumes by sectors determine in the end the value added by sectors and the total value of GRP.

The final demand elements that form the physical dynamics of production are defined as follows:

- household consumption is a function of prices, official (recorded) incomes of the population, and the extent of legalization of the shadow incomes;
- government consumption is a function of the corresponding expense items of the budget;
- fixed capital accumulation is a function of the sources of capital investment financing;
- exports to the Russian Federation is a function of the respective items of the output and use in Russian economy;
- exports outside of Russia is an exogenous variable depending on the extent of implementation of the export-oriented strategy;
- imports of products is a function of the respective elements of the intermediate and final consumption.

The list of the key exogenous variables of the model which affect the calculation results under different scenarios is short. They are:

- A coefficient characterizing higher growth rate of exports in Ivanovo region in comparison with the Russian exports as a whole. This coefficient is certainly not a directly controlled economic policy parameter. However, the region's export opportunities, to a large extent, depend on the activity and specific actions of the regional authorities. By including this variable in the model, we can estimate the outcomes of the efforts which could be undertaken by the regional authorities to strengthen the export orientation of the region (side by side with developing business opportunities and receiving support from the federal center).
- A coefficient characterizing higher price growth for exports of Ivanovos' producers in comparison with the respective prices from the RIM. While the above coefficient is meant to demonstrate the relative lead of Ivanovo region in the quantitative characteristics of export, this coefficient is supposed to describe the relative lead in the quality of exported goods. Both coefficients are related to the concept of improving the exchange proportions.
- Increase in the rate of tax collection. The rate of tax collection in Ivanovo region is currently estimated at 65%. Therefore, the maximum increase in tax collection rate could be 35 percentage points.
- Decrease of capital flight. The initial estimate of the annual outflow of capital is USD 50-100 million. We assume that a targeted economic policy of the regional authorities coordinated with efforts undertaken at the federal level may ensure a substantial decrease in the illegal capital outflow. It is further assumed that a decreased capital outflow will lead to a corresponding increase in final domestic demand and, hence, will be an important factor in accelerating the economic growth.
- Share of returned capital. We assume that capital which has been taken out of Ivanovo region during more than a decade (which we estimate at USD 1 billion) may become, under an appropriate investment climate, a potential resource of investment into the regional economy. Thus, this variable shows the percentage of the exported capital coming back to the Ivanovo region's economy.

- Decrease in the volume of hidden income. As our analysis has shown, the share of unaccounted earnings is quite high in Ivanovo region. Their legalization means legalization not only of individual incomes but of those of businesses.. The region's tax base could be thus increased.
- The share of capital expenditures in the budget. Model based calculations demonstrated that a possible mobilization of the could be available reserves may increases budget revenues to a such extent that government spending on capital investment in the respective scenarios can be significantly increased.

### Scenarios and forecast

#### *Inertial scenario*

Calculations on the basis of the Ivanovo region model coordinated with the corresponding model for the Russian economy, showed that even in the framework of the optimistic development scenario for the Russian Federation, the improvement of the economic situation in Ivanovo region is very insignificant under the inertial scenario.

The relative backwardness of the region not only persists but the economy is lagging behind at an accelerated pace. For instance, the share of the GRP in the Russian GDP falls to 0.22% in 2020 from 0.32% in 1999.

#### *Export-oriented scenario*

When we chose the export-oriented scenario, there is a sharp improvement of all indicators. At the same time, we need to admit that the export-oriented scenario in its pure form, where all other exogenous parameters are fixed at the basic levels, is not very realistic for several reasons.

First, export orientation cannot become stronger by itself, without an active economic policy to boost production efficiency in all directions.

Second, though in this scenario the growth of capital investment outstrips the growth of GRP, it is clearly insufficient (taking into account a nearly ten-fold decline in previous years) to ensure a 4-6% annual growth of GRP. In this sense, this scenario can be considered insufficiently balanced. On the other hand, it enables one to estimate the potential "capacity" of the export orientation strategy and compare it with other key directions of the economic policy.

### *Scenario of mobilization of the internal reserves*

The internal reserves mobilization scenario is, to certain extent, an opponent to the previous one, because all other model variables describing the activation of economic development are involved here, while variables determining the strengthening of the export orientation of the Ivanovo region economy are excluded.

The calculation results demonstrate that the combined effect of these factors is weaker than the effect of export orientation.

### *Scenario of balanced growth*

This scenario is a kind of combination of the previous two. On the one hand, it implements the export-oriented strategy, and on the other hand, it involves mobilization of all reserves, which are primarily related to the shadow economy.

According to the obtained estimates, this scenario proves to be the best one by several criteria. However, the per-capita GRP estimated using the ruble purchasing power parity is only USD 7,000. It means that the implementation of this option does not achieve a per-capita GRP of USD 12,000.

It is essential that, in the framework of the assumptions of the model and using the described set of the model variables, it is virtually impossible to attain greater increments of economic dynamics and the standard of living in Ivanovo region before 2020.

The main results of the long-term development forecast for the Ivanovo region are presented in Table 1, Fig.1, and Fig.2.

Table 1

	<b>2001-2005</b>	<b>2005-2010</b>	<b>2011-2015</b>	<b>2016-2020</b>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
<b>GDP of Russia</b>	<b>5.4%</b>	<b>3.7%</b>	<b>4.3%</b>	<b>3.4%</b>
GRP IR - inertial	3.4%	1.6%	1.6%	1.3%
GRP IR - expoprt-oriented	4.8%	4.3%	5.1%	6.0%
GRP IR - mobilization of rezerves	4.4%	3.6%	3.8%	3.1%
<b>GRP IR - balanced growth</b>	<b>7.8%</b>	<b>6.2%</b>	<b>5.8%</b>	<b>6.3%</b>

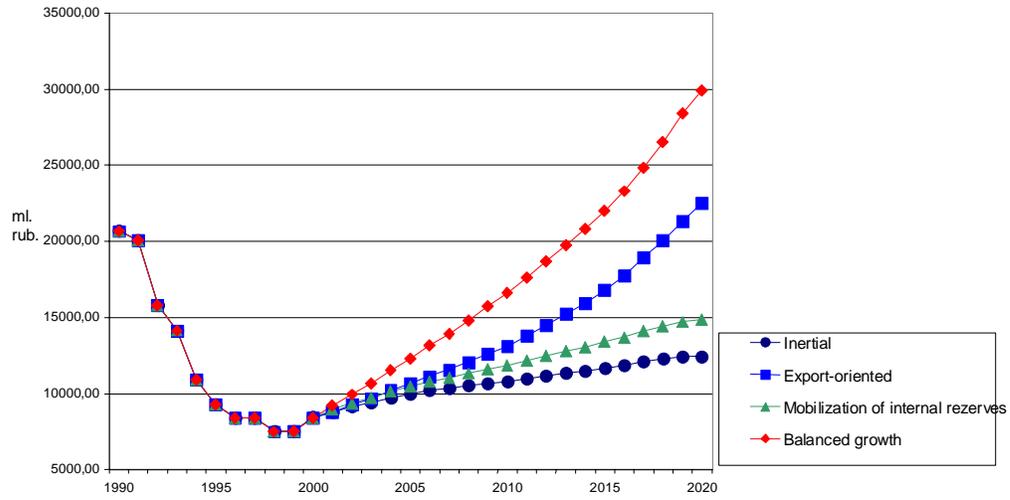


Fig. 1 Ivanovo region GRP by alternatives (constant 1997 prices)

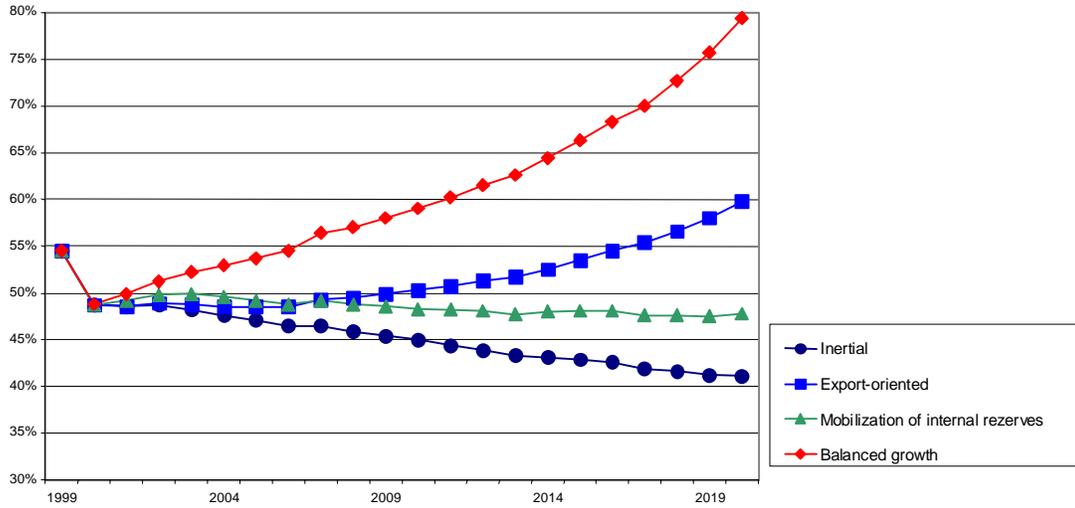


Fig. 2 Per-capita consumption in Ivanovo region in relation to Russia