

Melent'ev, Boris Viktorovich

Conference Paper

Development of interregional tools for predictive modeling of spatial proportions of economy

54th Congress of the European Regional Science Association: "Regional development & globalisation: Best practices", 26-29 August 2014, St. Petersburg, Russia

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Melent'ev, Boris Viktorovich (2014) : Development of interregional tools for predictive modeling of spatial proportions of economy, 54th Congress of the European Regional Science Association: "Regional development & globalisation: Best practices", 26-29 August 2014, St. Petersburg, Russia, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

<https://hdl.handle.net/10419/124255>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Development of interregional tools for forecasting spatial proportions of economy¹

Institute of Economics and Industrial Engineering, Siberian Branch, Russian Academy of Sciences Received

Scientific researches share economics conditionally on three interrelated parts: planning, economic regulation and organization. Each part reflects complex management objects, and as a result, they are subject to different approaches of real processes modeling. We will concentrate on the instruments of the first listed objects, highlighting input-output interregional models. They relate to application tools of the Integrated Analysis and Forecasting (planning), where scenarios are characterized by the levels of production, depending on the material, labor, capital cost and objective constraints on production. In many pure regional forecasts these factors are differentiated by natural resources, environmental, technological and other conditions, but often without consideration explicitly of export and import flows of products within the country.

Interregional models date back to input-output tables and input-output models without regions with discrete time over fixed years in a consistent task within the period under review (L. V. Kantorovich, V. L. Makarov, A. A. Shirov² and others). It is seemed attractive to use these models for interregional subject matter both in the aspect of coverage of complex reality and in the aspect of their realization and further development. However the use of above mentioned approaches to the spatial regional subject matter is carried out for certain years. This is due to both great labor intensity, poor information support, programming and technical capabilities and big volatility of optimized decisions over the years within the period of time.

The peculiarity of interregional (spatial) models is that they contain blocks describing interregional product supplies and conditions for the development of regional economies. Such reasonable explanation of economic objects have made these tools far more complex both in terms of the principles of behavior description and information support and in terms of the technical implementation of respective tasks. Developments of models of this class are based on studies by U. Isard³, H. Chenery, A.G. Granberg, V.I. Suslov, Yu.S. Yershov, etc.

Feature of concerned models is a reflection of the economy on the whole territory of the country. Real known problems describe the **space** by Federal Districts of Russia and the subjects of the Siberian Federal District (10-20 space points, 40-50 branches). Joint consideration of economies of **regions**, even in a partially aggregated form, provides regional forecasts with mutually balanced external **links** for each region. In addition, ultimate performance indices are

¹ Paper was prepared with the support of RFH, project №13-02-00413a "Modernization of transport and economic space of Russia: forecasting based on the use of complex computable models".

²A. A. Shirov and A. A. Yantovskii, "On tools of long term economic prediction" *Ekonomist*, No. 2 (2008).

³U. Izard, *Methods of Regional Analysis; an Introduction o Regional Science* (Technology Press and Wiley, 1960; Progress, Moscow, 1966) [in Russian].

backed with a necessary production sectoral base spread across different regions, in which particular socioeconomic decisions are made. There are also relatively alternative approaches when a forecast for a particular federal subject is made using fixed and specifying data on interregional links.

Among the great variety of dynamic model statements in the indicated class with discrete times, those solution patterns have been chosen during applied detailed calculations, according to which dynamics develops step by step in line with particular years of a distinguished period of time. At the same time, a one year static interregional task is solved at each stage. The transition from one year to another is usually programmed, and a user of these systems does not follow the step by step process interactively. This class of models is quite worked out and is a good additional tool for analysts when it is necessary to give national economic assessment of the effectiveness to present reporting economic proportions or to their changes in the implementation of a large-scale economic policy.

The table shows one variant of the estimated temperate forecast of Russia's economic development, based on more moderate general assumptions of the expected future state⁴.. Dynamics of aggregate output varies between 2.5 and 3.5% until 2030. Sampling of some Siberian regions defined geographical proximity to author's residence is reflected.

Indicators of expected development options depend on global economic growth. These parameters are set via the trade balance conditions. According to calculations export grows with reducing rate of 8,0-2,0 % , with an annual incidence of trade surplus of 1-1.5 %. The cited sources estimate the global economic growth until 2030 as 3 - 3.5% (or even less) of annual growth . This is slightly less than in 10-years period until 2010. The Russian economy has the same estimated growth dynamics that is determined by many of the same problems, especially with the more technologically developed countries.

⁴ http://www.garant.ru/products/ipo/prime/doc/7*0209010 (28.II.2014)

Average annual growth rates of Siberia regions for five-year periods (2015-2030),%

Sector	Region	6. Kemerovo oblast			7. Novosibirsk oblast			9. Krasnoyarsk krai			Siberia			Russia		
		2015-2020	2021-2025	2026-2030	2015-2020	2021-2025	2026-2030	2015-2020	2021-2025	2026-2030	2015-2020	2021-2025	2026-2030	2015-2020	2021-2025	2026-2030
1 Plant breeding		104.8	103.5	104.8	103.1	104.9	104.3	103.8	103.5	102.9	102.1	103.1	103.1	102.9	103.4	103.6
2 Forest sector		99.2	98.8	100.5	100.0	97.5	98.9	103.0	104.6	105.6	101.4	101.2	104.3	99.7	99.4	102.0
4 Coal mining		103.9	104.1	100.6	98.0	102.9	101.2	94.1	102.8	104.6	101.9	102.2	101.2	101.8	102.6	100.7
5 Oil production					101.5	102.8	102.4	102.5	105.6	106.4	103.4	104.7	104.2	98.9	99.9	101.6
6 Gas production								105.9	105.0	105.5	105.0	103.6	104.5	99.0	101.3	102.9
7 Iron ore mining		97.1	96.7	79.2	95.9	97.1	98.7	99.9	103.8	103.6	100.5	104.9	102.5	97.8	99.8	100.0
12 Timber		99.6	99.2	101.7	102.9	104.1	105.5	102.6	104.9	104.9	101.5	103.3	103.7	100.1	101.3	102.6
13 Cellulose and paper		96.8	98.9	101.3	100.8	98.8	98.8	106.2	108.6	109.0	105.7	107.3	109.0	100.3	106.5	105.8
15 Coke		99.2	98.8	99.4	98.0	99.2	98.8	100.9	98.9	84.5	100.5	98.8	89.6	99.5	98.4	92.6
16 Oil products		101.5	101.9	99.8	101.8	100.4	101.2	104.6	104.8	102.9	101.3	103.0	102.5	102.2	103.7	101.4
17 Chemistry		99.6	99.2	99.8	100.6	98.1	97.7	101.5	102.4	103.5	100.7	101.2	102.7	99.8	99.4	99.9
19 Ferrous material		101.3	102.9	104.5	101.9	99.1	100.8	100.1	102.1	104.3	101.4	102.7	103.6	98.9	98.4	100.2
20 Nonferrous metals		102.6	104.0	103.9	101.3	101.9	102.4	100.9	103.2	104.1	100.7	101.5	102.6	100.1	102.0	103.3
22 Machine building		101.0	101.6	102.2	102.4	102.6	105.4	101.5	102.8	104.8	101.5	100.5	103.1	101.7	102.6	103.5
24 Power engineering		103.7	101.2	102.8	101.1	102.0	103.2	102.0	105.0	106.4	102.2	104.2	105.8	104.1	103.3	102.7
31 Railway transport		99.1	98.7	99.8	115.3	102.5	103.9	102.7	104.0	104.8	102.0	105.2	107.0	102.6	103.6	102.4
32 Pipeline transport		99.2	98.8	100.2	100.0	101.1	101.8	103.3	105.9	105.6	102.6	107.1	108.4	100.0	105.7	104.1
33 Road transport.		102.1	102.7	104.3	105.4	105.5	106.2	104.6	105.7	106.7	103.1	104.1	105.4	106.4	105.0	106.9
34 Communications		104.8	104.3	102.7	99.1	104.4	103.9	100.8	103.8	106.3	103.5	104.0	105.0	106.4	105.2	104.3
41 Animal farming		99.6	102.4	103.5	98.4	102.6	103.4	99.6	103.5	104.5	100.0	103.7	105.7	99.9	103.8	103.7
44 Beef and dairy production		101.3	102.2	103.8	100.4	102.3	104.2	102.3	104.3	106.2	103.6	104.6	105.6	102.5	104.7	103.3
45 Flour and cereals industry		99.6	99.2	99.8	98.4	99.6	99.2	100.0	100.4	101.0	99.6	100.9	101.5	99.3	100.5	101.6
51 Aircraft		100.0	102.6	106.2	103.4	105.0	106.3	100.8	104.0	106.2	104.6	105.3	106.3	103.7	106.2	104.1
52 Terminal services		99.4	99.0	100.4	103.9	104.4	104.8	100.8	106.2	107.1	106.4	107.4	109.5	105.6	107.0	104.1
Total		103.4	103.6	104.5	103.2	104.4	103.0	102.6	104.2	105.6	103.3	105.9	106.6	103.4	103.7	103.3
General characteristics of interregional flows of products																
Departure in production,%		91.1	93.8	94.3	75.9	80.3	77.9	79.6	91.4	93.9	94.4	95.5	96.6	56.7	72.2	86.2
Arrival part in consumption,%		95.7	92.5	87.2	97.6	98.0	98.9	51.1	61.6	64.6	78.4	89.2	80.6	43.5	54.3	73.7
Transit part in turnover,%		61.6	71.2	80.7	52.7	62.5	70.5	75.2	73.4	78.0	72.1	71.0	77.7	56.1	52.4	50.4
Overall outflow with export, bln rub		4 337	5 812	8 700	3 901	4 974	6 472	6 672	9 101	12 720	37 448	43 016	53 420	108 900	142 096	230 536
Investment capital,%		102.1	103.0	105.2	102.2	104.2	106.0	102.1	103.0	104.2	102.5	104.7	105.7	102.7	103.1	104.6

Among them: negative demographics, the effects of increased life expectancy of people of retirement age, increased costs of habitat conservation, indirect, through foreign trade, effect of reducing the gap in rates between the industrially developing and the developed countries, increased dependence on world market prices due to the increasing over the last 20 years Russian raw materials specialization.

Estimated forecasted dynamics is more modest than previously traditionally considered 5-10 years ago. Nevertheless, it is not bad, but requires measures for consolidation of appropriate economic policies. They are known and incorporated in presuppositions of calculation: fixed capital investment for this should grow by at least 3-5% per year with declining capital intensity, qualitative upgrade of obsolete equipment, which should compensate the loss of the economically active population. It should be primarily domestic sources. Foreign immigration should be limited to the sad experience of Europe: economic indicators are rising, but the social problems are exacerbated, complicating the outcome indicators of development that cover not only purely economic indicators. Additional problems may arise for Russia due to export reducing because of possible sanctions of the U.S. and Europe on grounds of political reasons. As a consequence, the assessment of final consumption may decrease in 2014-2015., but there appears an incentive to expand domestic demand of growth in the processing sector. Considering the opportunity of applied tools, it will be interesting to point out the impact on territorial economic shifts and give their quantitative assessment.

Nowadays, as we know, there is an outflow of population from the eastern regions: people go where standard of living is higher and where a job is. However, in virtue of the accepted premises, when productivity in the eastern regions compensates out migration, the excess of overall growth rate of output over the national one by 1.0-1.5 percentage points in average persists to the end of the period. This is especially noticeable in the Krasnoyarsk Territory, Novosibirsk and Irkutsk regions. It persists beyond the period under review. Specified excess, together with maintaining of technical support, if it is increased by 1-1.5 percentage points for most Siberian regions, would be equivalent to the total excess for the period of growth of final consumption by at least 0.5-0.7 percentage points. This situation is defined by the preservation of Siberian specialization in natural resource extraction. We can notice that for processing industries there are future backlogs and noticeable progress towards strengthening the processing sector: wood products, chemical, dairy and meat industry.

Traditionally, taking into consideration the long distances, the development of all types of transport persists, including productions of services: cargo handling. Stable growth of inter-regional cargo dispatch indicators, the total turnover, export and import of products by an average of 20-30% is a reflection of mentioned. An increasing proportion of transit in the total

cargo by 7-10% per year in almost all areas of Siberia is a feature of the inter-regional transport. To a certain extent this is due to the initial premises of traffic growth from China and other south-eastern countries through the territory of Siberia. If part of this flow of cargo displaces through Kazakhstan direction, Siberian indicators of interregional exports and imports of goods will decrease.

Peculiarity of used equipment is physical composition of the modeled objects. That is why input normals in constant prices are used as source information. These prices are also a measure for output: production releases, export and import flows. Theoretically it is possible to use natural indicators, but usually the level of aggregation is high, often do not allow this operation. In connection with the foregoing, the obtained forecasts are free from the conditions of the financial system and all the mechanisms regulating the current activities of production, focusing experts mainly on structural and technological spheres and distributing sides of forecast sphere, in a single process of balancing the scale of production and meeting the resulting needs in the country. But, of course, the financial indicators have an impact on the real economic dynamics, and many authors introduce these dependencies in the models.

Nevertheless, the construction of financial proportions, which are relevant to received forecasts of physical composition, is the next step of input-output work. Its content is to build interregional financial balances "Payments-Income" for the future. The basis of these balances are the mentioned models of input-output table (Input-Output) and optimization interregional models of physical composition to which the instruments of current financial flows are adjusted. Financial subject matter is a logical step in the development of input-output tools of forecasting of physical composition as far as modern economic mechanism of actual economic regulation assumes an advanced financial sector. Classical optimization input-output (product) models are not yet adapted for the development of detailed applied forecast of regional prices and compound financial balances over the territories as in general the dual estimates for interregional models have no characteristics of current prices.

The financial balance model of each region reflects the financial relations of a region's economic entities with each other and their relations with other regions, including foreign countries. These entities include the population that realizes economic activities, earns income, and undertakes expenses in this territory and the region's industries and banking, credit, state, and other organizations. In terms of the content, a regional financial balance is an instrument (document) in which a region's income and expenses are indicated, as well as the flows of payments of its economic entities for products and services bought and sold and other financial transactions.

Externally, a financial balance is similar to the better known intersectoral balance of production and distribution of output (IBPOD). However, even in terms of the production and distribution conditions, their elements generally differ from each other which is caused by differences in the moments of product shipping and actual payment for raw material costs, changes in payables and receivables, expansion of the conditions that reflect credit flows, etc.

In an intersectoral balance of production and distribution of output, which is known internationally as an “input–output” table, production output and consumption are reflected in monetary terms across different sectors. When an index is given in monetary terms, it implies that production output tallies with sales proceeds. In practice, these indices are usually different. Financial balance lines show the total real proceeds (positive elements) and the amount of monetary payments for product supplies to particular producers (negative elements). Financial balance columns show the payment of costs (for raw materials and services) by a given producer (negative elements) and the cash inflow in a given year: proceeds, credit funds obtained, subsidies obtained (positive elements), etc. That is why it is reasonable to refer to a financial balance as a “payment–income” table (see figure).

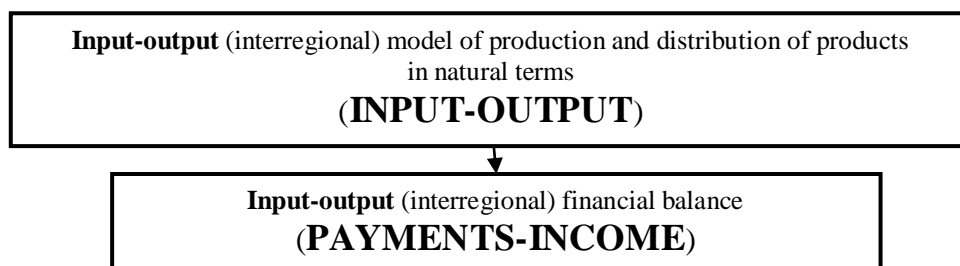


Fig.1 Scheme of sharing instrumental support tasks of physical and financial structure

The given financial balance scheme links total income with expenses and their concordance with material security. Disclosure of payments requires a more detailed presentation of the income and expense sides in all items of the cash flow of the banking and budgetary systems. If an interregional input-output model⁵ is used instead of the classic scheme of IBPDO, there will be even more differences because of interregional payment cycle indices. In addition, the resultant sectoral activity indices expressed in terms of cash, such as benefits and salary, are not taken into account in the generic interregional input-output model .

The scheme of calculating a forecast is realized in the form of the particular specialized tasks indicated above: planning (I) and regulation (II). To solve the former task based on models, such as that in [1], a forecast of the development of productive powers is made for all regions in the form of tangible indices of production output and distribution in kind (if possible) or at usually comparable (constant from year to year) prices across regions.

⁵ A. G. Granberg, Basics of Regional Economy (Tacis. Gos. univ. Vysshaya shkola ekonomiki, Moscow, 2000).

In addition to the principal function of predictive calculation of prices (price indices) and financial flows that ensure the aggregation of income and expenses in production, state institutions, and banking sectors for all considered regions, financial balances can be used in analytical quantitative evaluations of the influence of different measures of interregional federal tax policy on regional price formation. For instance, tax deductions can be used as input control parameters in a financial model within the framework of the widely debated and important for Russia interregional policy of leveling tax deductions. Since they are components of price indices, these values affect their ultimate target level (output values of aggregative prices). Postoptimization analysis using models of this kind allows one to evaluate considerable changes in price indices to adopt particular variants of tax formation. Calculations using interregional models also allow one to obtain a quantitative evaluation of the influence of restrictive factors (land, natural and labor resources, etc.) from the perspective of economic efficiency. Taking into account climate specifics, the total value of appreciation of salaries and capital investments can be taken as the initial basis for calculating differential payments for the studied territory. For instance, if the conditions for differentiation in practical land exploitation, depending on the climate and based on previously used aggregative appreciation coefficients of capital investments, are accepted, then, according to approximate estimates, the bottom level of the average federal tariff for using one square kilometer of land will vary from 100 to 300% of the land use tax rate for territories with worse and better climatic conditions, respectively. This interval will be considerably expanded by more detailed calculations, in which other factors are taken into account, as well as in the event of considering sectoral influences (effect of the quality of land and soil and climatic conditions in agriculture, geological conditions in mining, limited area of the best and central territories in towns and suburban dacha communities, etc.). A similar accounting method of unearned income can also be used for mineral replacement tax payments.

Calculations according to interregional financial balances (IFBs) made at the Institute of Economics and Industrial Engineering, Siberian Branch, Russian Academy of Sciences, show that, compared to classic tangible (product) balances, these balances allow one to solve a wide range of new tasks. Certain experience in calculations has already been accumulated for 53 sectors and 19 regions across Russia in regard of the solution of the following tasks:

- making a forecast of aggregative prices (price indices) that allow one to form basic financial, income, and expense indices at the prices of the current forecast year;
- determination of the regional financial resources according to the forecasted level of the final consumption and production program;
- evaluation of the price change given changed assumptions regarding the conditions of sectoral salaries, profitability, and their intersectoral ratio; regional and federal budgetary

expenses; and distribution of budgetary funds and regional budgetary transfers across different sectors;

- calculation of changes in current price indices and trends in federal tax rates in the policy of interregional leveling of production conditions and actual income;
- evaluation of the price index amidst continuing trends or deviations from these in variants of budgetary expense behavior, interbudgetary transfers, surplus profitability of particular sectors, credit based and other financial relations among regions and countries, foreign trade duties, inside–outside price ratio, etc.

All the **tasks** enumerated above characterize in terms of quantity the response to decision making variants that are manifested in a fixed level of controlling parameters of an interregional financial balance or analyzed conditions referred to this group. In many respects, predictive hypotheses of input data parameters (according to expected net benefits, salary, taxes, etc.) reflect both imitated decisions by production entities according to the current mechanism of economic regulation and federal financial policy. The considered tools allow one to take into account a lot of indices used in predictive macroanalytical works and evaluate their general mutual influence across the economy in terms of quantity: perform various calculation of household, regional, and federal budgetary incomes, credit flows, and, ultimately, the financial balances of all regions. All financial indices are determined by the level of target prices that depend on the assumptions of a solution variant. Calculations to evaluate the effect of an increase in normative profitability across sectors, for instance, also lead to an approximate rise in the price index but with an ever increasing price differentiation across regions. A reflection of the resulting requirement for general financial equilibrium against the background of reality, in which each sector wants a local increase in profitability and respective sales prices, the index of regional and federal taxes increases in a similar way. These requirements also weigh upon the classic conditions for supply–demand equilibrium that can be taken into account in the considered tasks only indirectly.

Taking into account the specifics of the considered tools, it would be especially interesting to consider in this work a quantitative evaluation of the effects of leveling conditions for economic activity across regions. This problem is not new. Regional differentiation of federal taxes to compensate for the influence of natural, geographical, climatic, and economic factors is a topical issue for Russia, the territory of which is characterized by an extreme diversity of the above indicated factors. Unfortunately, there is no single record of this matter in any of the variants of “tax codes,” which indicates the quality of the practical solution of this problem. Disregard and even partial underaccounting of the inequality of economic conditions can sharply aggravate the development of federalism in Russia.

There are three approaches for solution of inequalities in regional development.

1. Direct and additional financing of both regional budgets with the help of regional support and development funds and sectoral businesses by using the indicated means, as well as tariff setting, encouragement of export supplies, etc.;

2. Tax benefits for particular regions at equal tax rates across the country. It should be noted that this refers to federal benefits. The current Tax Code sets the upper limits of regional tax rates within which regional taxes can be decreased according to a decision by a local administrative organ. As a result, regional authorities have certain freedom of modifying their tax policy, depending on the conditions of a subject territory;

3. Leveling of production and living conditions using federal taxes differentiated across regions.

Nowadays, the first two approaches are mainly used. They are quite **labor-intensive** (however, not always efficient). In addition, there are no legally formalized concrete principles and rules of distributing the money from the indicated funds. It is already clear that this money will mostly be in demand in northern and eastern regions. When money is limited, the allocated amounts are distributed in the form of emergency subsidies; they are determined on quite subjective terms; there is profiteering from the redistribution requirements due to a risk of ethnically and socially determined crimes; sometimes, funding decisions are made privately, and they often depend directly on the authority and energy of regional leaders; and they are sometimes used to settle political issues. The development of basic federal standards of social security has barely started, and these standards will mainly provide social guarantees to groups of people in dire need.

Whereas it is more or less clear how the given standards will be supported and what form they will have (they will depend on the economic income), the essence of traditional rules of providing federal support can be changed due to their clarification. The second principle of selective "donation" of tax exemptions is also far from ideal "not to hurt the feelings of equality of all regions".

Nowadays, when economic management follows the blended-market principle, Russia inclines to increase the involvement of the third type of interregional influence on the conditions of economic activity, i.e., regulation by regionally differentiated federal taxation. Logically, this procedure fits better with the essence of modern economic management through the economic environment. To ensure that businesses from different regions bear equal responsibility for decisions they make and receive comparable incomes relative to different material costs and, ultimately, more or less equal living conditions in all regions, equal economic conditions for business activities must be ensured. This leveling must ease the impact of unfavorable natural

and climatic conditions and differences in the quality of agricultural lands and the value of natural resources, historically determined infrastructural economic underdevelopment of certain territories, etc.

To our mind, these taxes can be formed based on economic territorial rent, most of which must be transferred to the federal budget. In our opinion, economic rent goes beyond the classic definition of factor rent as additional income in comparison with conditions without this factor. In addition to high quality land, highly skilled manpower, and a beneficial geographical position, there are other purely economic factors that affect income differentiation. In particular, this differentiation is determined by price differentials across regions; additional income withdrawn by organized entities that work as territorially dissociated agent firms affiliated with production monopolies that increase transaction costs; and other income unrelated to the results of a particular efficient productive activity.

It is clear that the differences in production and living conditions among Russia's regions are mostly objectively determined by natural and climatic factors. All this leads to a "physical" rise in costs, including the cost of living. That is why the salary in respective regions must be higher than in the south. No matter in what region one lives, he or she must be paid a salary that would ensure that the quality of their life is the same as of those who live and do the same job in other regions. However, higher salaries ensuring equal well-being in northern and southern regions will increase local production costs and objectively make locally produced goods less competitive than the same goods produced in the European and northern parts of Russia, not to mention the fact that the indicated regions also have to bear greater material and other costs due to underdeveloped infrastructure, insufficiently skilled manpower, additional hiring expenses, etc. Since under favorable conditions additional income is unrelated to the performance results and is only determined by "God-given" advantages, an additional tax must be imposed on the respective regions. The greater part of payments under this tax must be transferred to the federal budget and not kept in regional business or budgetary income. This tax can be replaced with higher federal tax rates.

There is no doubt that concrete rates of leveling taxes are important in practice. The rates can be determined, for instance, according to the principle of reverse rise in costs across regions that sets the degree of income differentiation. A real initial step can be to take into account the influence of a small number of regional conditions, for instance, mentioned nature and climate. In more complex rates, a totality of elements is considered that determine the rise in costs according to different conditions. As experience is accumulated, the number of these elements can be reasonably increased so as to reflect more exhaustively the diversity of regional influences.

Russia has had much experience in deriving regional coefficients of “physical” rise in costs. In the Soviet Union, this experience was widely used in the administrative system of economic regulation. Nowadays, these coefficients can be used to calculate tax rates following the principle of “reverse” rise in costs. (The conditions of Central Russia have been traditionally used as the source basic parameters with which indices of other regions are compared along the scale of regional differences.) If a respective federal law is adopted, even information regarding the minimal subsistence level can be used to calculate the territorial differentiation of tax rates to take into account the influences of salary differentiation. In terms of the “physical” rise in costs due to natural and climatic conditions, seismicity, etc., the previous coefficients of rise in construction costs still hold true because climatic and natural geographical characteristics do not change much during foreseeable periods of time.

If interregional leveling with regionally differentiated federal taxes is achieved, then the uniform approach with quantitatively equal tax rates across regions will be retained for the other branch of traditional regional taxes. It is a matter of principle to consider the formation of equal conditions for regional economies to be a national task of utmost importance, which will create prerequisites for extenuating direct interventions of federal authorities in the regional system of economic activity. Other ways of forming federal taxes will only complicate interregional relations, because regions will not give up for any reason the additional rental income they have.

The adoption of leveling principles in regional differentiation of federal taxes will allow regions to earn their proper income and ultimately gradually exempt them from the necessity to ask the national government for subsidies in Russia. The need for the indicated steps is sufficiently clear because they are already being taken by a lot of federal subjects in their territories with the support of hinterland producers. The indicated principle of differentiating federal tax rates based on climatic factors of rise in construction costs has been used in our calculations. In line with the solution of the “regulation” task, aggregate price indices are determined that show the expected changes for a particular period at the current prices of combined groups of goods and services, salary reappraisal indices, credit interest rates, and other financial parameters. At the same time, target levels of income, components of the interregional payment turnover balance, subsidies, and other income elements can be varied (corrected). This correction is related to variants of providing financial support to industries and households, which reflects different strategies of socioeconomic policy. Using the tool of intersectoral material financial balance to solve such tasks of evaluating managerial solutions will allow experts to obtain information regarding the possibilities to compensate losses by attracting budgetary funds, necessary amounts of financial support, additional income or losses, etc. When

managerial solutions are developed, this information will be determined in line with each strategy of tangible and financial prediction.

The general calculation of experimental results to evaluate interregional financial policy with the help of the model program set in⁶. Of course, any decision in the financial sector produces effects in changing the current level of prices, interest rates by region, etc., leading, ultimately, to the financial condition, which are hardly predicted using traditional tools. The results are shown in table 1. It is significant, for instance, that at a general inflation rate of 6.5% the economy ensures a greater increase in salaries; however, this requires a decreasing trend in regional and federal taxes, as well as in the refinancing rate set by the Bank of Russia (evaluation of credit issue for regional commercial banks).

In this variant, measures to decrease taxes in Russia's eastern regions in line with regional climatic coefficients of salary are reflected. The calculated results have indicated positive financial trends that generally allow one to be "moderately optimistic" about the implementation of the indicated policy that decreases the differentiation of regional sectoral price indices by 3–5% as compared to the indicator of deviation from the average price. This can be considered positive for maintaining the price parity among markets of borderline federal subjects. Within the framework of the very same variant, a hypothesis about the breakeven economy of the eastern regions has been realized. The breakeven has resulted in a minor increase in the overall price index (by 0.5–0.9%) and in the regional differentiation of sectoral prices (5–8%).

The calculations have indicated that, if the group of derived forecasted indices is considerably expanded compared to the tasks of materially evaluating the tangible structure of the economy, the proposed tools will become sufficiently available. The list of these indices is expanded at the expense of sectoral price indices balanced across regions, regional financial balances, interregional cash flows that come in and out of regions as payments for product supplies, and other current indices of a particular prediction year. The broader use of these tools is impeded by their considerable labor-intensity and a lack of software and sufficient information. It is not an exaggeration that we require more information for financial calculations, than for purely product intersectorial spatial tasks.

According to the statement as currently formulated, it is impossible to directly analyze in the credit system the stability parameters of the banking system and, in particular, to evaluate noncollateralized credits. These parameters can be determined after model calculations based on the expected behavior of yearly financial flows. The latter determine the behavior of banking capital, and the standard relations of disbursed credit amounts to these flows determine their

⁶ V. I. Suslov, V. S. Kostin, G. I. Zabinyako, E. A. Kotel'nikov, and B. V. Melent'ev, RF Patent No. 30 (2011).

adequacy and security against vulnerability. Indirectly, the state of the banking system is tracked with the help of target emission and credit flow indices. These indices also characterize only the potential trend in standards (interest rates) because the resultant indices in a calculated variant are determined by the principal conditions providing the overall financial balance.

For this and other options increased price index in the extractive industries is a sustainable result, which requires further analysis of the level of profitability of these industries. The declining index of credit flows in most regional banks Siberian RF subjects and peripheral European banks also indicates to this.

Nonetheless, by tracking the behavior and absolute value of evolving financial ratios (accumulation of credit debt, surplus profitability, and other target indices), experts can evaluate the influence of the financial sector on recession or real sectoral growth and form corrective trends of the current financial policy. In particular, high profitability and credit debt in certain sectors indicate that the respective physical **forecast** of the real sector's growth is unrealizable. On the other hand, the potential payment balance and financial misproportions can be evaluated according to financial ratios of exports and imports with foreign credit amounts, given that, for instance, the indicated credit amounts are not consistently settled with export proceeds and the payment balance is not covered with gold and forex reserves. Relending of construction in progress, for instance, reflects imbalanced demand, customers' solvency, and the real potential of construction entities. In the task of predicting the tangible composition of the real sector in the compulsory fulfillment of this task (fixing a compulsory order) at least results in a decrease in ultimate consumption and, possibly, production volumes, etc. The approach with tools "Payments-income" is sufficiently productive. It is not a "monster" which has "everything" but it covers major positions: federal and regional budgets, including tax payments, income and expenses of businesses and households, and the flows of funds of the regional credit and banking system and of the Bank of Russia. The model can be used together with tools for predicting more detailed product prices and cash flows.

The little experience of performed calculations showed the adequate availability of suggested tools having good expansion of received forecasting indicators in comparison with the physical composition tasks. The list of these indicators widens on account of region-balanced sectoral price indices with current for **forecast** year, financial balances of regions, interregional flows of money income entering to and emerging from the regions in the form of product supply and other indicators.

In our opinion, the development of this approach is useful both in learning process, i.e. it makes more transparent usually difficult for understanding relationship between natural-product and financial parts of the economy, and for use in interregional analysis and forecasting. Of

course, the method is very time-consuming with information content, but it is a reflection of real economic life⁷.

⁷ (issuing is expected) Evaluation of Variants of Economic Regulation with the Help of Interregional "Payments–Income", B. V. Melent'ev, Studies on Russian Economic Development, No. 6, «Pleiades Publishing, Inc.», (2013)