SECTION IV

SOCIO-ECONOMIC PROBLEMS OF SIBERIAN TERRITORIES

RISK AND COMPROMISE IN THE INTERACTION AMONG REGIONAL ECONOMIC AGENTS: THE CASE OF NOVOSIBIRSK OBLAST

Galina A. Untura[1]

The paper considers regional economic system as a coalition of agents: individuals and legal entities, federal and regional authorities. In the system there occur risks of interaction among economic agents in the event of their failure to fulfill financial obligations to each other. In this paper methodological approach and mathematical model for the assessment of integrated risk of disturbance of holistic and sustainable regional economic development have been proposed. The model presents and considers main financial flows between the agents, such as monetary payments to population, tax payments to budgets, budget spending, net profit of agents, and total financial resources of the region ensuring effective interaction between diverse economic agents of the region. Scenarios and compromises of interaction of economic agents are a set of conditions that ensure a normal level of social and economic living conditions of the public in the region. Optimization criterion in the model is the minimum of integrated risk in the region.

The analysis of the expected effects of different scenarios of economic agents' behavior correlating the assessment of integrated risk of interaction between economic agents has been made. Empirical results have shown that it is possible to reduce the risk of failure of fulfillment of social obligations to the population by increasing the diversity of economic and financial relations between the regional economy agents.

BASIC IDEAS AND HYPOTHESES, BACKGROUND

The recent changes in the federal structure and management of the Russia (RF) have given more legal and executive powers to its constituent units. Two new subjects of state power have appeared – the RF subjects (oblasts, krays and former autonomous republics) and inter-regional associations uniting territorially associated subjects of the Federation.

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[1] Prof., D.Sc.(Econ.), Chief Researcher, Institute of Economics and Industrial Engineering, Siberian Branch, Russian Academy of Sciences (IEIE SB RAS), Novosibirsk, Russia.

Along with new subjects of power, market-based economic agents have appeared, including those with private ownership. The co-existence of conventional and new market institutions has led to that each subject of power or of economy performs a certain set of functions, is endowed with appropriate rights and is acting according to its motivations.

In the administrative-economic system the interaction among the agents was governed by plans through a centralized system of material-technical supply and flows of money and credit by which the established national economic proportions were sustained. As the underlying idea of plans was that they represented the social-economic goals of the nation, enterprise or region, the problem of security of goals achievement was related to the security of fulfillment of plans. Problems of social protection and living standards in regions were also put in relation to the fulfillment of plans.

The transition to a market-based model of economy introduces many changes in the system of interactions because now each economic agent has its «own» goals which can be achieved under a certain efficiency of input-output relationship (Von Neumann J., Morgenstern O., 1970; Rawls J., 1995; North D., 1999; Porter M., 2000; Errol P. Mendes, Jeffrey A. Clark, 1999). Central planning deals with security of plans given from top, while «self-planning» (i.e. business-plans of firms, investment projects) with security of payback of supposed costs and sufficient income to sustain the socially acceptable living standard for their staff. Factor of uncertainty is inherent in any economy. And in this respect the problem of security is invariant of the economic mechanism, be it rigid central planning or, the other way around, self-planning. While in the former case the security of the made decision is paid for by the state, in the latter case it is primarily production units. And while under central planning the strongest factors of uncertainty were lack of coordination between activity of production units in the regions and the social conditions of its residents as well as interruptions in material-technical supply, under cost-benefit relations the sources of information uncertainty affect sales of products, technological processes, partners in large projects with a high degree of risk.

If the regional economic system is viewed as a coalition of economic agents and subjects of federal and regional power (we call them economic agents), the problem of security and risks should be examined from a systemic aspect. In our view, in parallel with goals of security for each subject, a concept of integral risk of interaction among regional economic agents developing under the action of the economic mechanism should be put forward.

It should represent security for the residents which means that in the result of economic reformation, economic restructuring and emergence of new market institutions the fundamental conditions of life activity, i.e. employment, level of incomes, a set of social goods/services of education, health care, social welfare etc., will continue. If the security of achievement of a high level of social-economic development in a particular subject of federation is not high, then it is possible to speak about emergence of regional risks for normal population processes. In this context, therefore, it seems reasonable that jointly with the concept of security that of risk should be considered proceeding from the understanding that the higher is the security of goal implementation, the lower is the risk of negative consequences in case of its failure. So the study of risks would permit, with scientific substantiation, to approach the formation of reserve funds at the regional level.

The objective of the research is to develop a methodological approach and its formalisation in the form of a mathematical model for assessment of flexibility and integral risk in the development of regional economic system which would provide a set of conditions for a normal social-economic level for the region's residents. Participants and objects of compromise in the form of a set of conditions in the regional system are described in detail in the preprint (Untura, Evseenko, Zverev, 2001).

The tasks include:

1) to reveal major factors influencing the security of interaction among economic agents in the region;

2) to assess their impact on reducing the risks of individual agents of regional growth with the use of a model to make assessments of integral risks of implementation of various scenarios of interaction of agents and, in particular trade-offs between the production and the budgets of the federal and regional levels.

As the working hypothesis is a statement that a sharp imbalance of financial flows under influence of uncertainty of many market factors is the major cause of risk of the interaction.

It is supposed to consider risk of the economic functioning of an economic agent with respect to its incomes and expenditures balance which is achieved with a certain degree of probability, caused by uncertainty of the behavior of all members of regional coalition in the market environment. In practice, the cases of insecurity and risks have got recently a form of universal unpayments. We are going to develop an economical-mathematical model in order to make calculation experiments on assessment of security and risks in inter-action among regional economic agents.

METHODS TO BE USED

The methodological basis of the study will be systems analysis (Untura, 1999; Untura, et al., 2001; Untura G., Zverev V., 2002). The object is a system (coalition) of regional agents of the Novosibirsk oblast. For examination of their interaction special methods of retrospective analysis of the economic mechanism and methods of economical-mathe-matical modeling describing the balance relationships of expenditures and incomes of major economic agents of the region and financial flows among them will be considered.

Description of the structure and relations in the model. The model provides six blocks describing the following economic agents according to spheres of their activities:

1) production sectors (profitable and unprofitable);

2) sectors of services (social-sector and commercial);

3) extra-budgetary funds (formation and spending of social and special funds);

4) financial-credit sphere (local banks and subsidiaries of central and other regional banks participating in attraction and allocation of regional financial resources);

5) households (incomes and expenditures of the employed, pensioners and unem-ployed);

6) federal and regional authorities (formation and allocation of budgets of different levels).

The model simulates only the key financial ties that form a major part of the financial potential of the region, i.e. that part of financial flows among the objects represented in the model which are associated with monetary payments to population and their expenditures, tax deductions to budgets and spending from the budget in the region - distribution of net profit, attraction and placement of financial resources in the region and outside.

The model represents monetary flows providing for the interaction among different spheres of the regional economy. Such flows considered in the model are the following to:

1) the sphere of production – that part of enterprise income (produced added value, in-cluding wage fund, free residue of profit and compulsory payments, taxes, levies, etc.);

2) the sphere of services – financial receipts from different sources (equivalent to in-comes) and compulsory payments (taxes, levies, etc.);

3) financial sphere – employed monetary resources, allocated monetary resources and compulsory payments (taxes, levies, etc.);

4) extra-budgetary funds – financial receipts from different sources (equivalent to incomes) and payments (financing the sphere of services and payments to population);

5) population – incomes and expenditures;

6) budget – receipts of financial resources from different sources and expenditures of the territorial budget.

The model takes into account the effect made on the financial situation of each agent by other participants of the regional economy described by these ties and, vice versa, the effect of the financial situation of an individual agent on the stability of the regional economy (in terms of generation or prevention of integral risk). Such description of these ties allows tracing the direct and indirect effect of individual economic agents on the whole totality of the agents of the regional economic system.

In the formalised record of the model each economic agent is presented by a system of conditions describing the formation of its financial results with employment of inner and external financial flows. These conditions reflect either requirements of functioning «without loss», or sufficiency of resources for the execution of the target program by appropriate economic agents.

The model conditions include also constraints on the fulfillment of the expenditures of territorial budgets, extra-budgetary funds, incomes of different groups of the population. In particular, risks for residents include reduction of the normal level of average labor payment, impossibility to raise incomes up to the subsistence level. In establishing the parameters of these constraints considered were the established norms of social security legally adopted at the federal and regional levels.

The final result of the interaction of the above considered sphere of the regional economy is provision of an acceptable living standard for its residents.

The parameters of economic agents' ties are determined on the basis of the operating economic legislation (for interactions among executive bodies of different level, public-sector organisations and the rest of economic agents of the region) as well as on the basis of available estimates of market parameters (interest rates on credits, average wage, shares in the distribution of incomes etc.)

The model estimations will permit to analyse the consequences of different scenarios of the economic agents' behavior and determine directions for reduction of local risks and integral risk of their interaction.

As a criterion of risk, minimization of integral risk in the region can be used in the model (formal record of the model shown Untura, Zverev, 2002).

The study will permit to make both systemic qualitative analysis of individual causes influencing the security of the achievement of the regional system's goal and to obtain certain quantitative assessments of the integral risk and consider possibilities for reducing them under different scenarios and variants of the development of regional systems. Simultaneously, it will be possible to assess the flexibility and controllability of regional systems understood here as the maximum ability of the regional economy to perform structural, technological, organisational and economic restructuring in a broader sense. In scenarios this can be presented by its constituting elements: 1) presence of sufficient reserve capacities; 2) allocation of reserves that are at the disposal of regional bodies; 3) increased structural flexibility due to the necessary diversity in the structure of regional economy which creates different institutional ways to achieve the development goals.

It is supposed to perform a retrospective analysis of factors determining the structure and functional properties of the economic mechanism, such as: the recognised conception of economic activity; target direction of region's development; economic priorities; type of regional reproduction process which was used to provide interaction among economic agents in the region. The results of the analysis are needed to prepare different scenarios for exper-

imental calculations by economical-mathematical simulation (Untura et al., 1999; Untura et al., 2001; Untura, Zverev, 2002).

Information base. Applied calculations on the assessment of security and integral regional risks are supposed to be made with respect to the Novosibirsk oblast with the use of the regional statistics, forms of tax and bookkeeping accounting, assessments of the state of regional budgets by experts and of extra-budgetary funds by the officials from regional government.

RESULTS

The results of model calculations in the Novosibirsk region showed: for the period 1997–1999 there was an increase in the value of the integral risk in the economic system of the Novosibirsk region by 2.2 times in the absence of a compromise agreement between the parties.

Table 1

**The structure of the integral risk of interaction between economic
the subjects of the Novosibirsk region in 1999, %**

Types of risk	Scenario, without compromise	Scenario, compromise
Integrated risk	100	100
Risk of loss of production	5.1	20.4
Risk of non-productive sphere	28.0	40.2
Including:		
Risk of budget organizations	26.7	36.2
Risk of self-supporting organizations	1.2	4.0
Risk of financial sector	22.5	37.0
Risk of extra-budgetary funds	0	0
Risk of non-income population	44.5	2.4
Risk of budgets	0,0	0,0

In addition, implemented strategy (without compromise) changes the structure of its risks: increase local risks to the subjects of non-manufacturing, financial, credit and industrial areas. At the same time during the period of greatest risk for the specific gravity of the population practically saved. Hypothesis about the possibility of reducing the integral risk due to compromises interaction members of the regional system was confirmed for population (Table 1). The magnitude of reduction or increasing depends on the scenario of compromise, which takes into account the number of participants and the strategy for implementing the priorities of individual socio-economic development in the region. For example, overall level of integral risk in 1999 reduced by more than 1.7 times in a scenario of coverage compromises all sectors of the economy compared with the situation the lack of compromise, i.e. if contractual activities of economic entities have not agreed. Implementation of compromise can significantly change the structure of integral risk. The compromise allows fundamentally change the proportion of the population in the risk structure of integral risk. He is reduced by 42.1 percentage points. At the same time significantly increased risks: the production sector – 15.3, non-productive sphere – 12.2, financial and credit sector – 14.5 percentage points. Thus the largest risk of the non-manufacturing sector is the risk for subject to budgetary organizations. There is a redistribution center of gravity of the integral risk with the risk of local population to the risks of other areas (Table 1).

A series of calculations on the private compromises in the regional economic system (affecting some sectors of the economy) has shown varying degrees of influence of each of them to reduce the integral risk. In this case, the 4 groups of agents were clearly marked. The average estimates of each groups show possibility of the risk reduction differ by more than 3–10 times (Table 2).

Table 2

**The characteristics of Reducing risk of the groups of branches
of the Novosibirsk region in 1999**

Group Number	Group 1	Group 2	Group 3	Group 4
Reducing risk in the integral compromise in a particular industry, bln Rubles.	92.50	34.67	11.60	3.46
The share of risk reduction, %	1.30	0.49	0.16	0.05

The first group: transport, engineering and metalworking, agriculture, construction, energy, food-processing industry;

The second group: housing and utilities, retail and catering, private sector market infrastructure, communications, computing and information services, non-ferrous metallurgy, building materials industry;

The third group: non-productive public services, chemical and petrochemical industry, wholesale and foreign trade, light industry, MTS and the work piece;

The fourth group: health (commercial services), other material production, ferrous metallurgy, fuel, forestry, woodworking industry, other industrial production, education (commercial services), geology and exploration, microbiology, printing industry, forestry, commercial services in culture, art and science.

Correlation between the degree of reduction of the integral risk and changes in specific parameters (net profit, wages and taxes) branches of different groups has observed. In scenarios where a compromise in a particular sector the largest decline integral risk provides a compromise administration, public enterprises and transport, engineering, agriculture and other primary industries Novosibirsk region belonging to the first group.

Calculations based on scenarios consistent expansion of the circle of participants (by adding groups of technologically related industries) have shown that the expansion of the number of groups of industries involved in the compromise, a reduction in the level of integral risk. However, the technology groups have different effects on the components of the integrated risk. This may occur deterioration resulting indicators to reach a compromise. In particular, when you add a group of processing industries to other participants' compromise there is a relative increase in the integral risk (due to increased risks in the credit and financial sphere). However, even with such a relative increase in the risk scenario integral compromise is less than that for a situation of lack of compromise between the administration and the public enterprises.

Thus, the application of the developed methods and models to assess the impact of compromise to reduce the r integral risk in the region by the example of Novosibirsk region shows that:

• firstly, the trade-offs between the administrations, economic entities allow increasing the income level of the population without increasing the amount of risk in the integrated regional economic system;

• secondly, to reduce the size of the integral risk depend on the type of scenario to reach a compromise in the region (for participation and ways to reach a compromise;

• thirdly, the regional administration has an opportunity to assess the priorities support for individual industries in the region, depending on their contribution to the reduction of the integral risk.

SIGNIFICANCE, DISSEMINATION

The results of the studies will be of importance to governmental bodies of the RF subjects since under new conditions of the economic activity they are in a great need for scientific approaches since the whole previous financial system and logistics of the USSR were destroyed in 1991. Starting conditions of the RF subjects turned out non-equal, technological ties even within the NIS have been destroyed which increases insecurity of regional development both of the RF and its regional units.

Scientifically, theoretical ideas about the assessments of security and regional risks for the RF subjects will be enriched. The difference of the proposed approach from the one existing in literature in publications on integral assessment of regional risk for investors is in that it yields an integral assessment of the risk of the regional environment on the whole instead of the risk in the result of interaction on the part of particular economic agents of the region. Such approaches do not regard special features in the process of reproduction associated with insecurity of material-financial links among economically independent agents including the residents who pursue their own interests.

In societal and social terms the results are important for the formation of reserve funds to support the population at the regional level. In our view, underestimation of the fact that it is the residents who really carry on themselves all the burden of the consequences of the «systemic» risk of non-effective economic activities and degradation of the economic potential of the region strips the government and regional administrations of a drive to look for positive policy measures such as creation of insurance funds that should accompany all the course of reformation and ameliorate the damage inflicted by a sharp deformation of the region's economic structure.

The results of the project can be of interest to the following categories of audience: regional and central politicians, economic scientists, sociologists and political scientists.

At the same time, the materials of the research will be of practical use also for the developers of documents about conjunction of rights and responsibilities of central and regional bodies of authority.

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