

## **METHODOLOGY OF ANALYSIS AND FORECASTING**

### **STATISTICAL REFLECTION OF THE ENVIRONMENTAL COSTS: PROBLEMS AND SOLUTIONS**

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The article highlights an urgency of the problem of a correct account and a statistical reflection of environmental protection costs. This fact is proved by authoritative specialists of national and international organizations. The paper shows main steps of formation and genesis of environmental costs statistics in our country since the 1970s. Main methodological documents, which have been established in this sphere recently, are listed. There is also a detailed justification of the need for appropriate calculations. Moreover, some broader issues of macroeconomic data of environmental activities in our country are touched upon, especially from the standpoint of the UN National Accounts System of the 2008 version and the System of Environmental- Economic Accounting 2012.

The centerpiece of the article is to describe the general algorithm and some specific features of the calculation of the index of physical volume of expenditures on environmental protection according to the technique developed by the Federal State Statistics Service (Rosstat). A characteristic of composition and structure of environmental costs accounted in Russia is provided; a detailed description of central parameters used in calculations is given; forms of federal statistical observation and applicable classifications and groupings are mentioned too. A significant part of the article describes offered methods and techniques of assessment with specific calculation formulas and arguments for their usage, i.e. a direct calculation algorithm is pointed out.

The authors examine several specific calculation results based on the methodology developed by Rosstat on the grounds of 2013 data. They also provide aggregated data presented in different groupings. Materials are illustrated by various figures and tables. The final part of the article contains brief conclusions and offers.

*Keywords:* environmental protection costs, grouping of environmental protection costs, institutional sectors, calculations of cost dynamics, volume indices, price indices, deflation and extrapolation methods, the gross domestic product, budget expenditures.

*JEL:* C10, C43, Q50, Q56.

### **METHODOLOGICAL APPROACHES TO IMPROVEMENT OF FORECAST ACCURACY BY COMBINING FORECASTS**

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The authors introduce problems of improvement of forecast accuracy and offer several ways of their solution, basing on a retrospective analysis of domestic and foreign studies on methodology of socio-economic forecast.

In their opinion, a real modern solution to the problem is in implementation of the approach, linked to forecast combination, because it is difficult to prefer one forecasting method to another.

Special attention is driven to private forecasts combination technique, to the efficiency of these combination methods and to the optimization of the number of selected forecast options for combination.

Combination of forecasts has already proved itself in practice and it is not inferior to the private methods of forecasting in accuracy. The main idea of combining forecasts is the use of all available information regarding various forecasting methods, even if these methods are not sufficiently accurate.

This paper is a review of different ways of constructing weights for combining forecasts. Methods of combining forecasts are described as follows: 1) by averaging private forecasts, 2) along with using the method of least squares, 3) involving minimization of an error variance of combined forecast, 4) based on retrospective forecasts 5) based on factor analysis, 6) with a use of paired comparisons, 7) based on sequential quadratic programming. Moreover, advantages and disadvantages of different methods of weighing rates are introduced.

The conclusion of the article contains tables with basic and most frequently used methods of combining forecasts and a description of results obtained from these method. There is also a vast bibliography of scientific publications, of both domestic and foreign authors on the subject.

*Keywords:* prediction, forecast, combined forecast, the association forecasts, weighting rates..

*JEL:* C53, E27.

## **MATHEMATICAL AND STATISTICAL METHODS IN SOCIO-ECONOMIC STUDIES**

### **STATISTICAL ANALYSIS AND MODELING OF LIFE SATISFACTION DYNAMICS IN RUSSIA FROM AGE PERSPECTIVES**

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The author examines life satisfaction of Russian citizens and identifies its main trends. Life satisfaction is an important indicator of life quality in each country. At the same time, modern studies have shown that age-life satisfaction profiles in developed countries have U-shaped forms.

The data of the Russia Longitudinal Monitoring Survey - Higher School of Economics (RLMS-HSE) from age perspectives for the period of 1994-2013 were analyzed. Russian data indicate that the level of life satisfaction decreases with older ages: young respondents are happier, while aged people are less satisfied with their lives. Dynamics of life satisfaction level during 1994-2013 had a positive trend from age perspectives: respondents in all age groups had become more satisfied with their lives by 2013.

On the basis of ARIMA-models for life satisfaction the forecast until 2019 has been simulated. The results demonstrate that life satisfaction gap will remain in different age groups. Young population (under 20 years) will be the happiest in Russia and the highest rates of life dissatisfaction will be observed in the oldest age group (over 60 years). Note also that a gender gap in life satisfaction remains in the older age group (over 60 years). In the first place, this is caused by feminization of the older population.

*Keywords:* life satisfaction, statistical analysis, age groups, ARIMA-models.

*JEL:* C13, C15, C53, I31.

### **SOCIAL EXCLUSION RISK AT THE REGIONAL LEVEL IN RUSSIA: METHODOLOGICAL FRAMEWORK AND OUTPUTS**

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The article is dedicated to weakly examined operationalization issues of assessing risks of social exclusion at the regional level in Russia. Social exclusion is defined as a disruption of one or more of the five vital interpersonal relationships of an individual within a society he/she lives in, namely: the relationships with family/household members; friends/acquaintances; colleagues/work associates; authorities/officials; neighbors/community.

A methodological approach to social exclusion measure as a number of population belonged to considered group at risk weighting by its probability of social risk occurrence has been developed.

Estimations of population at risk and probability of risk implementation were based on official statistics and data derived from an expert survey accordingly. Ratings for the Russian regions have been developed on the grounds of the values of integral and dimensional social exclusion risk.

*Keywords:* social exclusion, social exclusion risk, interpersonal social relationships, group at risk, deprivation, Z-scores, regional ratings.

*JEL:* C82, L83.

## **REGIONAL STATISTICS**

### **COMPREHENSIVE ASSESSMENT OF SOCIAL INFRASTRUCTURE IN THE REGIONS OF PRIVOLZHISKY FEDERAL DISTRICT**

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The article provides a complex evaluation of social infrastructure of Privolzhsky Federal District (PFD), based on 2009-2013 data. The relevance of the study is caused by the improvement of social services, which involve further elaboration of the analysis methodology and data on conditions and main development trends of social infrastructure and their availability to citizens.

The authors have analyzed main features of social infrastructure, which help in complex evaluation of a situation: health, education, culture and sport, transport and communication, housing and public services, trade and catering. A definitive estimate was calculated for each block, reflecting region's position. After that a complex evaluation of social infrastructure of PFD regions has been done.

Specific evaluations of provision level of social infrastructure units, which include dynamics of its variation in a given time period, effectiveness of social policy in given regions and conclusions on the need of events, which may improve a situation with components of this regionally important question.

*Keywords:* social infrastructure, health, education, culture and sport, transport and communication, public services, trade.

*JEL:* H54, O18, R10, R11.

## STATISTICAL STUDY OF INNOVATION PROCESSES AT THE REGIONAL LEVEL

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This paper provides the study of innovative capacity of regions of the Russian Federation. Statistical study of innovation processes at the regional level is highly relevant, as innovative activity and receptivity of the regional economy ultimately determine strategic competitiveness of Russia. The implementation of effective management of innovative activity of areas requires a realistic assessment of the level of innovative capacity both at some point of time and in dynamics.

The article discusses the concept of the innovative potential of the region for further study using statistical tools, analyzes different methods of calculation proposed in the economic literature, their comparative characteristics. The objective of this study is to develop a simple but effective tool that allows the level of innovative development of individual territories to be compared on the basis of publicly available information.

Using the experience of building global indices that characterize the innovative development, the Global innovation index (GII) in particular, the methodology of estimation of innovative capacity of the territories by constructing the Regional innovation index (RII) based on the analysis of component of innovative potential and its determining factors is proposed. Based on official statistics and data of the Central Bank of Russia RII is designed as an integrated indicator in a «primary indicators - aggregates - regional index» frame. The innovative potential of regions is reviewed basing on this index as well. The regions of the Central Federal district were chosen as the object of the research. Some special statistical procedures were applied to normalize the distribution of variables. Unlike some similar research the reliability level of architecture of the Regional innovation index was calculated. The dynamics of the index and fluctuations in innovative activities in the territories were studied too. The proposed methodology distinguishes apparent simplicity, versatility and direct semantic relationship with the already-established approaches. All this allows it to be considered as a practical tool for the study of innovation processes in the regions of the Russian Federation.

*Keywords:* regional statistics, innovation, innovation capacity, regional innovation index.

*JEL:* R12, O18, O31.

## INTERNATIONAL STATISTICS

### ANALYSIS OF THE INTENSITY OF PROCESSES IN THE MUTUAL TRADE OF THE CUSTOMS UNION AND COMMON ECONOMIC SPACE

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The paper presents a new methodological approach to the analysis of the intensity of processes in the sets of objects on the example of mutual trade in goods within the Member States of the Customs Union and Common Economic Space (CU and CES) in 2010-2014.

The authors state that the classical socio-economic dynamics analysis, based on growth rate indices, does not illustrate the intensity of traffic change within trade objects, which determine a turnover structure. The rate of natural increase is similar to the growth rate in demographic statistics. Birth and death rates help in estimating the intensity of demographic processes. When analyzing the intensity of processes within the mutual trade (both on the whole and in groups), authors advice using a similar approach. The difference is in the way intensity indicators are counted for those objects with – growth and – decline. There is also an integral index of process intensity, which is calculated by weighing the intensity processes indices for both groups of objects of the set, and an index of process intensity, which considers a direction of processes (increase/decrease).

The introduced indices, characterizing the intensity of processes in the sets of objects, are tested on the example of the mutual trade in goods of the Member States of the CU and the CES in 2010-2014. The results of the analysis show advantages of an introduced method and promote its usage along with other methods of statistics.

*Keywords:* international trade in goods, indexes of intensity of processes of the mutual trade in goods, growth rates.

*JEL:* C10, C40, C43.