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MODELS AND METHODS OF SYSTEM ANALYSIS OF DATA IN THE MONEY LAUNDERING COMBATING

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Abstract. The involvement of credit institutions in illegal activities, the creation and organization of work of money laundering schemes, the provision of shadow financial services using banking infrastructure is a serious problem that creates high risks to the financial security of the state.

The purpose of the study is to increase the efficiency of identifying credit institutions that are at risk of involvement in illegal activities.

Methods. The study applied the methods of cluster, factor and regression analysis.

Results. The article proposes approaches to finding the bank's integral reliability indicator for the current time using methods of cluster and factor analysis. On the basis of the obtained integral assessments, predictive models were built, allowing to identify trends, assess the prospects for the financial situation of banks in the medium term, predict license withdrawal.

Discussion. The proposed solution makes it possible to identify potentially problematic credit institutions that require the adoption of appropriate measures by the Central Bank of the Russian Federation in the exercise of its prudential supervision functions. With the help of the described approach, it became possible to identify banks involved in illegal activities, the organization of schemes for the provision of shadow financial services, which is essential for the Federal Service for Financial Monitoring.

Keywords: credit organizations, principal component method, predictive models, anti-money laundering.

INTRODUCTION

In order to assess the situation, which is the initial and most important stage in the decision-making contour, the financial monitoring processes and analyzes the incoming data.

In solving large-scale government problems, information systems are widely used. In particular, a powerful information system is used in the Federal Financial Monitoring Service. The complexity of the use of such systems is due to large flows of heterogeneous information coming from various ministries and departments [1].

The existing approach to assessing the situation in Rosfinmonitoring is reduced by experts assigning weights to the components of the vector, in the form of which one can represent the object of evaluation, and adding the results obtained.

This approach is accompanied by large time and resource costs and expert subjectivism.

In order to make competent management decisions, Rosfinmonitoring management requires reliable information obtained in conditions of limited time, computing and human resources.

This circumstance requires scientific reflection, on which the proposed study was directed.

Thus, the aim of the work was to improve the quality of management decision-making in the field of financial monitoring, develop and theoretically substantiate new approaches to the process of assessing the situation with the support of decision-making that exclude expert subjectivity in data processing and satisfy the time and resource indicators.

METHODS AND RESULTS

When ranking multidimensional objects, expert methods are usually used that are not free from expert preferences and subjectivism. An attempt was made to use evidence-based data.

For example, decisions were used to liquidate legal entities of the Supreme Arbitration Court of the Russian Federation. The analysis of these decisions showed that some liquidated organizations have signs of one-day firms. Such solutions were selected and systematized. The source material was obtained, based not on the intuitive guesses of expert analysts, but on court decisions.

From the decisions of the arbitration court, the most informative indicators were presented, presented in the correlation matrix of features.

From the correlation matrix it can be seen that the indicators are not independent and some of them strongly correlate with each other. Correlation of signs indicates that they are not orthogonal. Although this is sometimes seen intuitively, in this case, exact objective quantitative estimates, which are the correlation coefficients, come to the place of subjective assessments.

Taking into account the correlation of the indicators allowed to reduce the dimension of the tasks being solved twice and, thus, to reduce the complexity of solving the tasks.

The analysis of the weighting coefficients of the initial features for different main components is different, which gives grounds for their interpretation.

The second main component positively correlates with such indicators as the "period of the organization's activity", "the absence of non-current assets", "the lack of personnel", and negatively with the "lack of settlement accounts", "no address", "no movement of funds on accounts". This gives grounds to assume that the first group of weighting factors of the signs indicates that the legal entity that possesses them was created for the purpose of conducting real business activities, but due to some reasons, the organization went bankrupt. While the second group of signs suggests that a legal entity was created to cover illegal activities [2].

Thus, the lower the indicator containing the second main component, the higher the number of deviant subjects in the region.

Of particular interest is the analysis of the fourth main component, on the basis of the values of which zoning maps of deviant objects were obtained. This component reflects the geographical component of money laundering. Large values of the components fall on the subjects of the Federation, which have borders with foreign states or seaports, which is consistent with empirical results. Thus, for the first time, distribution maps of potential subjects of money laundering were synthesized.

When applying the method of principal components of factor analysis and when applying methods of the theory of pattern recognition, similar results were obtained, which indicates their internal convergence and reliability.

In order to verify the results obtained earlier, the ranking of the federal districts of Russia was carried out when processing data on limited liability companies contained in the Unified State Register of Legal Entities.

The first main component characterizes the business activity of the region.

The second main component reflects the level of the possibility of using legal entities for illegal purposes. In addition, new quantitative estimates of the performance of the Rosfinmonitoring staff have been obtained. The proposed methodology for ranking structural units of Rosfinmonitoring, which allows you to increase the effectiveness of decisions taken in the distribution of the bonus fund.

Credit organizations according to the Federal Law "On Banks and Banking Activities" No. 395-1 dated December 2, 1990 publish their financial statements quarterly [3]. The forms of this report contain hundreds of different indicators, which leads to the situation of a "curse of dimension" when solving regression problems.

Were obtained integral assessment of the reliability of banks. On their basis, predictions were made of the change in the state of the CR.

In the course of the analysis, various time series models were constructed for 723 credit institutions, both operating and with

a revoked license. Such models as ARPSS, models of exponential smoothing — simple seasonal, Winters model, Brown model, damped trend, Holt model are considered. The Bayes information criterion takes the smallest value for a simple seasonal exponential smoothing model (JSC Miraf Bank) and Winters model (Millennium Bank CJSC). This means that these models most adequately describe the historical values of the considered time series.

CJSC Millenium Bank, as well as JSC Miraf-Bank, tend to decrease the values of the second internal factor, which, in turn, indicates the deterioration of the financial situation of the credit institution and the inevitable revocation of the license by the Bank of Russia.

The assumptions were justified in February 2016, when these institutions were liquidated due to their inability to continue banking activities under the legislation in the credit and financial sphere.

The application of the principal component method in analyzing the attribute space of credit institutions makes it possible to obtain integral indicators of banks 'reliability at the current time, and also on their basis to identify trends, assess the prospects for banks' financial position in the medium term, predict license withdrawal.

RESULTS AND DISCUSSION

The proposed solution has practical value. It allows you to identify potentially problematic credit organizations that require the adoption of appropriate measures by the Central Bank of the Russian Federation in the exercise of their prudential supervision functions. With the help of the described approach, it became possible to identify the banks involved in illegal activities, the organization of schemes for the provision of shadow financial services, which is essential for the Federal Financial Monitoring Service. At the same time, accurate objective quantitative assessments, free from subjectivism, a possible political and corruption component, come to the place of expert assessments.

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