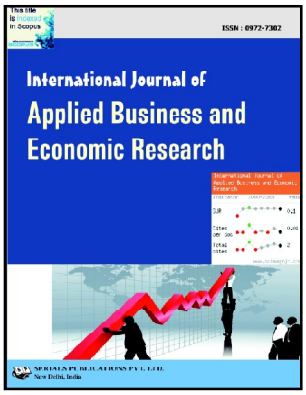

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Improvement of the Management System and Internal Risk Management of Commercial Bank

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Abstract: This article deals with modern approaches to improve the management of internal banking risk through the development and implementation of methodological foundations of control systems. An important feature of the proposed approaches to improving management and program implementation of the mathematical formalization of banking risk management is that they allow you to define the characteristics of the soundness of the banking information systems before their commissioning. With the aim of improving the system of risk management the authors of the article substantiated and software implementation of the system of internal risk management of commercial banks. The paper also deals with the developed scale for assessment of internal risks of banks. The authors presented a method of constructing information system architecture, assessment of internal risks of commercial banks. The main directions of increase of efficiency of credit risk management: introduction of control over the funded system, an insurance methods of risk reduction. In the framework of improving the system of risk management the authors suggest the system of management of internal Bank risk assessment methodology and credit risk when lending to corporate clients based on financial ratios, which has certain advantages over current methods used in banks.

Keywords: commercial bank, commercial risk, information system risk management

JEL Classification: G21, G32, D81

INTRODUCTION

The increasing scale and complexity of activities of commercial banks functioning in the conditions of unstable external environment, raises the quality requirements of data management by enterprises. The urgent becomes the problem of effective internal control of banking risks.

The main problems of the process of internal risk management activities of banks are characterized by uncertainty, which is an integral part of the process of risk management and due mainly to human error, lack of reliable information about the state of internal and external environment that gives rise to various alternatives, determine the optimal solution for effective risk management in the face of uncertainty. These problems determine the basic direction of this study.

Thus, the problem of ensuring effective internal risk management of banks current and due to the need for the stable development of commercial banks, which was of great practical interest and requires further research taking into account the Russian features (Eliseeva *et al.,* 2016).

LITERATURE REVIEW

The study of risk dedicated to the work of theorists of classics A. Ghana, J. Keynes, J. Lo, A. Smith, I. Fischer. Among foreign authors dealing with the study of problems of risk management, you can highlight F. Knight, G. von Neumann, L. Tapman, G. Since, D. Scott, etc. (Calder, 2004; Hennessy & Patterson, 2002; Night, 2003; Tapman, 2002; Vishnyakov & Radaev, 2008).

Development of the Russian banking system, analysis of banking risks is devoted to the work of such Russian authors as V.V. Alenichev, M.A. Bukhtin., N.I. Valentseva, Ya.D. Vishnyakov, I.F. Gindin, E.F. Zhukov, E.P. Zharkovskaya, E.V. Ioda, A.A. Kozlov, O.I. Lavrushin, B.V. Sazykin, V.T. Sevruk, A.Yu. Simanovsky, V.M. Usoskin, etc. (Buhtin, 2008; Ioda, Meskova & Bolotina, 2002; Sazykin, 2008; Servuk, 2007; Usoskin, 2006; Vishnyakov & Radaev, 2008).

In the field of applied problems of banking risk management are the work of R.D. Cavalcanti, T.W. Koch, P.S. Rousa and others; among Russian are V.P. Buyanov, N.A. Savinsky, A.A.Samarsky, V.G. Sokolov, E.A. Suprunovich, S.A. Filin, V.A. Chernov and others (Koch & MacDonald, 2000; Sokolov, 2003).

Western scholars in the study of the functioning of the banking system mainly come from the fact that the crisis phenomena occurring in this area, usually smoothed out by market mechanisms. However, in Russia these mechanisms are functioning effectively. For example, the financial implications of the economic crisis in Russia has shown the need to develop qualitatively new methodological approaches to the management of internal banking risk.

Considerable importance is the fact that "integration" of the Russian banking system in the world entails the necessity of taking into account international standards and requirements for ensuring the management of banking risks. It is necessary to take into account the Russian specifics of credit institutions at the present stage. Analytical work requires more sophisticated apparatus for their implementation than a simple statistical model of Bank risk assessment.

MATERIALS AND METHODS

We know that the domestic banking risks (DBR) are defined as macroeconomic parameters of the economy, e.g. inflation and dynamics of microeconomics. Microeconomics has a direct impact on the development of banking risks such as the accuracy of the present achievements of the technical and operational characteristics of a financial project, delayed the implementation of a financial project, the negative behavior of consumers and providers of banking services.

In the field of risk occurrence in the banking activity can be subjective and objective. Subjective risk is largely determined by the personal characteristics of the management of the CB (Commercial Bank) or the persons making any financial decisions. Objective financial risk is a situation in world and national markets, of managing incomplete information about the parameters of the Bank's information systems (IS) and the operating conditions, the economic and political situation in the state.

A key influence on the DBR has a political structure of the state, which determines its economic performance through the credit, financial, tax and monetary policy (Averchenkov et al., 2012; Erohin, 2015).

Among the factors contributing to the effectiveness of the quality management system (QMS) is a key factor of information support of IS. From that, how much effective used methods of formation of this collateral depends on the improvement of the basic characteristics of the functioning of the CB, increasing the competitiveness in the field of financial customer service of CB (Erohin, 2016).

The design of a Bank of IS should be based on the principle of mapping the totality of analytical parameters that determine the credit risks of borrowing analyzed client CB for all sorts of variations of debt management under different scenarios of market conditions in the long and short term. While the projected Bank of IS should provide ranking functions and analysis of the variations of management connected to a set of scenarios of the appearance of factors of the DBR.

The information of the source data processed in the banking on IS, are:

- data on the key parameters of the financial banking instruments: value of debt (guarantees and loans – amount outstanding debt instrument; for bond – setting of the volume available in the financial market of bonds; operation by instrument (loans – the size and date of interest payments; bond – dimensions and the dates of the payments on the coupons), etc.;
- data on the installed assets (financial instruments: loans, bonds, guarantees denominated in foreign currencies and rubles;
- data on the history of the manifestations of the factor of DBR.

For improvement of IS risk management in CB can be used by the control system of the DBR, presented in Figure 1.

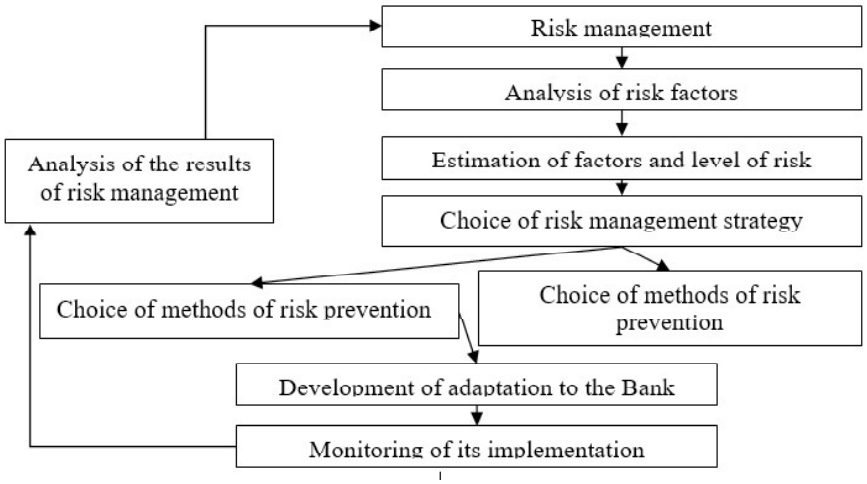

Figure 1: Management system of DBR

The control system of DBR (Figure 1) based on the rating method of assessment of the creditworthiness of the customer or the borrower of CB. This method includes the calculation of financial ratios and has such advantages in front of current methods in CB as: reducing the amount of time required for the risk evaluation on the loan; the volume growth of the customer base; reducing subjectivism; reduced requirements for the qualification of employees of CB; simplification of financial performance; consideration of the industry specifics of the banking customers. This increases the accuracy and quality of the evaluation of DBR (Eliseeva et al., 2016; Erohin, 2016).

In the banking system on the evaluation of FBG's financial indicators must meet two key criteria: financial ratios should fully characterize the financial situation of the client KB; financial ratios do not need to duplicate.

To evaluate the effectiveness of the analysis of DBR the presented method can be applied for corporate clients of CB. This will allow in practice to carry out Express evaluation of DBR, which can be taken into account for management decisions regarding the possibility of lending to corporate clients of CB.

Scale of evaluation of the DBR is determined by the formula for calculating the credit rating of clients of CB, which is determined by the number of points that a customer can dial the following methods:

$$Rj = \Sigma WiPi,\ i = 1 \ldots n,$$

where Rj –total estimation of financial indicators in points (credit rating); Wi –weight in group of i indicator; Pi– evaluation of the i indicator of the group, in points; n – number of indicators.

Use five classes of creditworthiness of corporate clients:

– the first risk group (the number of points R> 80) – the smallest degree of credit risk.

– the second risk group (scores 60 <R ≤ 80) – reduced the degree of credit risk.

– the third risk group (scores 40 <R ≤ 60) – average degree of credit risk.

– the fourth risk group (scores of 20 <R ≤ 40) – higher degree of credit risk.

– the fifth risk group (points R ≤ 20) is the maximum degree of credit risk.

To generate a report about the level of FBG is required to determine a set of parameters that determine the level of DBR in CB and to analyze their dynamics as key indicators of DBR. We consider it appropriate to highlight the following indicators:

- actual losses from realization events DBR according to the report;
- potential losses from the implementation of DBR events according to an internal DB (Database);
- the value of lost benefits, according to internal DB;
- cost under DBR;
- costs associated with the operation of DBR;
- the cost of maintenance personnel;
- staff turnover.

The actual losses from the implementation of the events of DBR according to the reporting data are formed due to: penalties, forfeits, penalties; Expenses from writing off shortages of material values; Payments for damages; Expenses from write-off of assets and uncollectible accounts receivable; Costs from writing off the shortage of cash and counterfeit currency; Litigation and arbitration costs.

The potential loss from the implementation of DBR events, and events involving loss of profit, populated on the basis of the internal database on the events of DBR.

The cost of managing of DBR consists:

– costs of employees of CB (other than wages);

– the cost of insurance, security, audit, advertising, hospitality, publication, reporting, etc.

The cost of maintenance of CB workers are their wages.

An indicator of the cost of DBR is determined based on the internal DB and represents the monetary value the total value exposed to the risk of losses from the events of DBR (e.g., transaction amount or transaction affected by the error, the cost of the financial instrument on transaction processing which the event occurred risk, etc.).

Information on turnover is sought in personnel CB Management in the form of a list of laid-off of employees across all divisions and CB departments.

In addition to calculating the actual level of losses, calculation of DBR in CB is carried out using the basic indicator approach and standardized. Basic indicator approach allows to calculate the level of capital allocated for FBG, standardized approach allows to make a conclusion about the susceptibility of the areas of activity of CB DBR based on the level of gross income in each direction. Indicator of the level of DBR, calculated on the basis of the basic index approach proposed by the Bank of Russia Regulation No. 346-P as follows:

$$OP = 0{,}15 \cdot \frac{\sum_{i=1}^{n} D_i}{n},$$

where OP – rate of DBR; n– number of years (should not exceed three years) preceding the date of calculating the size of DBR; Di – income for the i-th year, used for the purpose of calculating the capital reserve for DBR,

The index Di is determined by the following algorithm: ratio of Di for the year represents the sum of net interest income and net non-interest income – are calculated on the basis of form 0409807 "Report on profits and losses (published form)".

The level of DBR depends on the chosen indicator – gross income. This approach does not allow to assess the real scale of the losses, however, is an indicator for more careful attention to the business lines with elevated DBR. To assess the impact of DBR to the capital of CB by using the lookup the values in the formula for calculating the capital adequacy ratio (Osipenko, 2003).

In addition to the actual level of DBR and DBR level, calculated on the basis of indicative approaches, it is essential to estimate the level of DBR allows on the basis of internal data and trends to determine the

level of risk for a specified period. Assessment can be carried out using of IMA method. The method consists in determining the level of expected and unexpected losses based on analysis of internal statistics of CB for the selected period. For the purposes of calculations by this method were used the internal DB generated in the first quarter of calendar year. Short time range of the sample due to the initial stage of data aggregation on the events of DBR in the savings bank of the Russian Federation and the lack of a database on events and savings for past periods. Subject to the availability of human and financial resources of CB has the ability to hire highly qualified specialists, capable of forming "advanced" models of evaluation of DBR, and the use of specialized computing programs (for example, financial risk Manager INEK), which gives the possibility to calculate the level of DBR with the application of methods of modeling of losses and frequencies.

If you want a stress-testing of DBR, then it is necessary to simulate values of the estimated parameters determining the most manifested crisis developments and trends, the impact of which would be to increase the level of DBR.

For the implementation of the stress tests of DBR is necessary to analyze the dynamics of the parameters: the index LE, which identifies the financial loss; the indicator of the exposure EI; figure EVLE characterizing the cost of VBR.

Predictive value of DBR is calculated as the sum of expected losses (EL) and unexpected losses (UL).

Simplified definition of expected and unexpected losses is determined by the following steps:

1. Calculation of expected losses for business line k is calculated as follows:
    1.1. Calculation of the average amount of losses from sales of adverse events separately for each business line (k). To calculate this indicator you need to determine indicator LEj,k(T) is the total amount of losses of type j incurred as a result of realization of adverse events on the business line k for period T days.; and EVLEk(t) is a monetary estimate of the total cost subjected to the risk for line business k for day t.
    1.2. Calculation of the probability (frequency) of realization of adverse events for each business line k and sum. For calculation of an indicator defined by the monetary value the total value exposed to risk at each unitary operations l business line k of the day t on all adverse events (n is the number of recorded adverse events); EIk(t) – DBR subjected to a volumetric indicator, which is equal to the sum of transactions processed within each business line and the valuation day t from the operations conducted at this DBR facility. Developments leading to a potential, but unrealized losses are weighted by a factor "0.85", the events of DBR, resulting in loss of profits – on factor "0.65". Most likely to have the events of DBR, resulting in actual damages.
    1.3. Calculation of expected losses in k the business process.
2. Calculation of unexpected losses on business processes.

DISCUSSION AND RESULTS

The predictive value of the combined losses from the sale of the actual FBG events, potential events, and events for loss of profits, determines the level of capital allocated for DBR, is an indicator of exposure to DBR based on statistics of the distribution of the internal losses of CB (actual, potential, events, profits).

Conducting back-testing also plays a significant role in the evaluation process of DBR. Back-tests allow for the verification of calculations, and projections to adjust the estimated model to determine their degree of reliability. In order to conduct back-testing it is necessary to compare the performance of forecasts and realized in practice the events of DBR during the period under review. More objective than the sample, the more the period of statistical observations, the more likely you can carry out forecasting of DBR.

The use of methods of rapid assessment of the level of credit risk allows to cut the interest rate on the loan and reduce the amount of funds required for the reserve for possible loan losses.

According to the developed model, all units of CB are merged into a single information space. Interaction with a single information space and implementation of QMS of IS of CB is performed by various specialized software tools (PDM-systems).

In carrying out banking activities the risk management Department depending on the change of indicators of an assessment of those risks produce actions to manage them, including reducing the likelihood of DBR and minimize the consequences of its manifestation. Including such a procedure for liquidity risk (Gruning & Brajoviæ Bratanovic, 2007). In the framework of liquidity risk-management the task of evaluation is just one step in determining further action.

Architecture of IS valuation of DBR of CB should be based on the integration of the following subsystems: assessment of DBR, consisting of two main modules, and subsystems for stress-testing Bank liquidity.

All subsystems are required to use a single database that aggregates data from external sources to conduct further evaluation of DBR and measures for its minimization. It is assumed the simultaneous use of each module, because the results of the module definition of the relationship between DBR and its factors are the input information for the evaluation of DBR. However, it is possible to work on modules individually, in that case, if the composition of the factors were already determined, but need only produce an estimate of the current level of DBR of CB.

The source data for the implementation evaluation come from the IS database in the module to determine the relationship of factors of DBR. The feature of the algorithm of the process of determining the relationship between measures of the level of DBR and its factors is that it contains a selection of the most informative factors having a level defined in Bank of IS on the analysis of DBR.

The grader uses of DBR as the basis of the above model. As input use data about indicators of the factors of DBR and calculated the relationship between these indicators, which is performed in the previous step. Also, in case of detection of dependence between factors of DBR that is close to functional, the IS can be produced additional exclusion DBR factors. This step is only performed by direct confirmation by the operator.

The results of the evaluation module of DBR to determine the current level of DBR, which can be used in the other Bank of IS that implement various methods of Bank liquidity management. For example, the data can be used in the calculation, establishment and control of limits. The limit in this case is a quantitative restriction that is imposed on certain characteristics of the operations of CB (Erohin et al., 017). These characteristics can be the types of financial instruments, customer operations or financial-credit institution.

Subsystem stress testing of Bank liquidity consists of a module for stress testing and the module of formation of stress scenarios.

In the module, the purpose of the stress test used the data generated by the evaluation system of DBR and the possibility of forming certain in CB scenarios stress testing, which are deposited manually in the module of formation of stress scenarios. For calculations are used the threshold values of the factors of DBR defined for respective scenarios (Markov, 2012). This allows on the basis of the current level of influence of factors of DBR sensors to predict the level of DBR upon the occurrence of certain negative events. The results of the subsystem stress testing of Bank liquidity used by risk departments in the implementation of the methods of liquidity management.

CONCLUSION

The development of systems of internal risk management of commercial banks is one of the factors of increase of efficiency of the banking activity, due to a decrease in internal Bank risk, creating conditions for optimization of the credit process.

Analysis of the literature on the research topic leads to the conclusion that science, methodology and methods of research, aimed at covering domestic risks in the process of analysis of Bank activity, is only beginning to emerge.

Development of the system of risk management and centralization of internal risk management will allow banks to more clearly define its development strategy in the infrastructure market and to provide a safe, structured organization of internal audit.

The work was the study of improving the system of internal risk management of commercial Bank and the proposed approach to the assessment of DBR, has the following advantages: this approach is based on the real statistics of losses that were realized under the influence of DBR in the particular of CB, and reflects trends for the appearance of DBR given the specifics of CB.

With the use of this approach to the estimation of DBR level of the capital reserved under DBR would not be artificially inflated and will reflect the real amount of required financial capital to back it up.

This approach will predict the level of DBR in CB in the conditions of limited human and technological resources.

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