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ASSESSMENT OF THE IMPACT OF CREDIT SCORING MODELS ON THE QUALITY OF THE LOAN PORTFOLIO OF COMMERCIAL BANKS

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Abstract

In the current context of the banking system development, the quality of the commercial banks' loan portfolio is of key importance for ensuring financial stability and minimizing credit risks. One of the main tools for credit risk management are credit scoring models, which allow for an objective assessment of borrowers' solvency. The purpose of this article is to comprehensively assess the impact of credit scoring models on the quality of the commercial banks' loan portfolio. The paper examines the theoretical foundations of loan portfolio formation, the nature and types of credit scoring models, and analyzes their role in reducing the level of overdue debt and improving the efficiency of banks' lending activities. Particular attention is paid to the relationship between validated scoring models and key indicators of loan portfolio quality.

Keywords: Commercial banks, loan portfolio, credit risk, scoring models, loan portfolio quality, banking stability.

Introduction

In a market economy, lending is one of the primary sources of income for commercial banks, but it also serves as a major source of risk. Growing lending volumes, increasingly complex financial products, and macroeconomic instability increase the importance of effective credit risk management. Therefore, building a high-quality loan portfolio capable of ensuring the stability

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of the banking system and the confidence of depositors and investors is particularly important [1.3].

The quality of a loan portfolio directly depends on the effectiveness of borrower creditworthiness assessment mechanisms. Traditional analytical methods based solely on expert assessments are increasingly giving way to quantitative models, among which credit scoring models occupy a special place. The use of scoring allows for the automation of credit decision-making, increasing their objectivity and reducing the likelihood of human error [2.4].

In modern commercial banks, credit scoring is viewed not only as a borrower selection tool, but also as an important element of the overall loan portfolio management system. Properly developed and validated Scoring models can significantly reduce the level of problem loans, optimize the portfolio structure and increase its profitability[1.2.6].

The purpose of this study is to analyze the impact of credit scoring models on the quality of the loan portfolio of commercial banks, as well as to identify key factors that determine the effectiveness of their application.

Credit scoring models as a tool for managing the quality of a loan portfolio

The economic essence and evolution of credit scoring models . In the context of developing market relations and growing lending volumes, commercial banks are faced with the need to make quick and objective lending decisions. Traditional creditworthiness assessment methods based on expert opinions and individual analysis of borrowers have become ineffective over time, especially in the context of mass lending to individuals and small businesses. This has led to the need for formalized credit risk assessment tools, which has led to the development of credit scoring models. models[3.4].

Credit scoring is a system for quantitatively assessing a borrower's likelihood of fulfilling their obligations based on an analysis of a combination of statistical and socioeconomic factors. The economic essence of scoring models lies in the transformation of diverse information about the borrower into a single numerical

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indicator reflecting the level of credit risk. This indicator is used by commercial banks to make decisions about issuing loans, determining the interest rate, loan amount, and additional collateral terms [4.6.7].

The evolution of credit scoring models has gone through several stages. In the early stages, simple statistical methods based on the linear discriminant function were used. Subsequently, advances in information technology and the accumulation of large data sets facilitated the implementation of logistic regression, machine learning methods, and neural network algorithms. Modern scoring models are characterized by high forecasting accuracy, but at the same time, demands on data quality and validation procedures are increasing .

Classification of scoring models and their functional purpose

In banking practice, scoring models are classified according to various criteria. Depending on the stage of the credit process, they are:

- application scoring , used at the stage of reviewing a credit application;
- behavioral scoring used to analyze the current behavior of the borrower;
- collection scoring aimed at managing overdue debt.

Each type of scoring performs a specific function in the loan portfolio management system. Application scoring minimizes portfolio entry risk by eliminating borrowers with a high probability of default. Behavioral scoring monitors portfolio quality over time, and collection scoring helps reduce losses on problem loans [1.2].

Thus, credit scoring models form a comprehensive tool for managing the quality of a credit portfolio, covering all stages of the credit cycle.

The value of validated scoring models for banking activities

Validation plays a special role in improving the quality of the loan portfolio Scoring models. Validated models ensure the reliability of forecasts, the robustness of results, and compliance with regulatory requirements. Using unvalidated models can lead to systematic errors in risk assessment, which

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negatively impacts the quality of the loan portfolio and the bank's financial stability.

Validation allows us to identify model weaknesses, adjust parameters, and adapt it to changes in the macroeconomic environment. Therefore, validated Scoring models are becoming a key factor in increasing the efficiency of commercial banks' credit policies[6.7].

The Impact of Credit Scoring Models on Key Indicators of Credit Portfolio Quality

Impact on the level of overdue debt . One of the most significant indicators of the quality of a loan portfolio is the level of overdue debt. A high proportion of overdue loans indicates an ineffective borrower creditworthiness assessment system. The implementation of scoring models can significantly reduce the volume of overdue debt by more accurately predicting the probability of default [5.6].

Scoring models allow banks to differentiate borrowers by risk level and make more informed lending decisions. This reduces the likelihood of including high-risk borrowers in the portfolio, which positively impacts its quality.

Credit scoring models influence not only the level of risk but also the structure of the loan portfolio. The use of quantitative assessment methods allows banks to more effectively allocate credit resources among different borrower segments, economic sectors, and regions. Optimizing the portfolio structure helps reduce concentration risk and improve the bank's resilience to external economic shocks. In this context, scoring models serve as an important tool for strategic asset management in commercial banks.

Impact on the profitability of credit operations

The quality of a loan portfolio is directly linked to the profitability of lending operations. Reducing the level of problem loans allows for a reduction in loan loss reserves, which positively impacts the bank's financial performance. Furthermore, scoring models enable more accurate interest rate setting based on

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risk, improving pricing efficiency. Thus, the implementation of scoring models not only reduces risk but also increases the profitability of commercial banks' lending operations.

Problems, risks and prospects of using credit scoring models in commercial banks

Limitations related to data quality and structure . The effectiveness of credit scoring models is largely determined by the quality and completeness of the source data. Insufficient credit history depth, gaps in data, and inconsistencies in the information provided with the borrower's actual financial situation significantly reduce the accuracy of credit risk forecasting. This problem is particularly acute in countries with developing banking systems, where the information infrastructure of credit bureaus is still in its infancy.

Furthermore, using outdated data can distort scoring results, as borrower behavior and macroeconomic conditions are subject to dynamic changes. In the face of inflation fluctuations, changes in household income, and interest rates, previous models may lose their predictive power, negatively impacting the quality of the loan portfolio [7.8].

The problem of sample imbalance, when the proportion of reliable borrowers significantly exceeds the proportion of problematic ones, deserves special attention. Under such conditions, scoring models may demonstrate high overall accuracy but perform poorly in identifying borrowers with a high risk of default, reducing the model's practical value for loan portfolio management.

Methodological and regulatory risks of using scoring models

Along with data quality issues, methodological limitations significantly impact the effectiveness of scoring models. Complex models based on machine learning algorithms often boast high accuracy, but are characterized by low interpretability. This creates certain difficulties in explaining credit decisions both within the bank and to regulators.

Regulatory requirements for model-based risk management require transparency of the methods used and the ability to justify every decision. Therefore,

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commercial banks are forced to find a compromise between forecasting accuracy and the interpretability of scoring models. Failure to comply with regulatory requirements can lead to sanctions from supervisory authorities and damage to the bank's reputation. An additional risk is overreliance on automated decisions. Complete automation of the lending process without expert input can lead to erroneous decisions in non-standard situations, especially during economic crises.

Comparative analysis of the advantages and limitations of scoring models

For a more visual presentation of the problems and advantages of using credit scoring models, it is advisable to use a comparative analysis (Table 1).

Table 1. Advantages and limitations of using credit scoring models

Indicator	Advantages	Restrictions
Accuracy of risk assessment	Reducing the subjectivity of decisions, increasing objectivity	Dependence on data quality
Speed of decision making	Accelerating the review of loan applications	The risk of a formal approach
Portfolio management	Reducing the share of problem loans	The need for regular validation
Regulatory compliance	Increasing transparency of processes	Difficulty in interpreting complex models

The use of scoring models can significantly improve the efficiency of credit portfolio management; however, their application requires a systematic approach and ongoing monitoring.

The Impact of Scoring Models on the Dynamics of Credit Portfolio Quality

To assess the practical impact of implementing scoring models in commercial banks, it is advisable to analyze the dynamics of key loan portfolio quality indicators before and after their implementation. One such indicator is the share of problem loans in the total portfolio.

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Prospects for improving scoring models and enhancing the quality of the loan portfolio

Current trends in the digitalization of banking create the preconditions for further improvement of credit scoring models. The integration of big data, alternative information sources, and artificial intelligence technologies allows for significantly improved accuracy in assessing borrowers' creditworthiness.

In the long term, the development of scoring models will contribute to the formation of a more resilient and diversified loan portfolio, reduce systemic risks, and strengthen the financial stability of commercial banks. However, achieving these goals is only possible with a comprehensive approach, including regular model validation, data quality control, and compliance with regulatory requirements.

Conclusion

The study suggests that credit scoring models are a key tool for managing the quality of commercial banks' loan portfolios. In an environment of growing lending volumes and intensifying competition in the banking market, the effectiveness of borrower creditworthiness assessments largely determines the financial stability of banking institutions.

An analysis of theoretical and practical aspects showed that the implementation of scoring models helps reduce the level of credit risk by more accurately predicting the probability of default. The use of validated The use of scoring models allows us to minimize the share of problem and bad loans, optimize the structure of the loan portfolio, and increase the profitability of lending operations. validation is of particular importance in ensuring the high quality of the loan portfolio. Scoring models. Validation ensures their adaptation to changes in the macroeconomic environment, borrower behavior, and regulatory requirements. Neglecting this process can lead to distorted risk assessments and deterioration in banks' financial performance.

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The study also revealed that, despite the obvious advantages, the use of credit scoring models is fraught with a number of challenges and limitations related to the quality of source data, the interpretability of complex models, and the risk of overly automated credit decisions. Therefore, it would be advisable for commercial banks to use a combined approach combining automated scoring methods with expert assessment.

In the future, the development of digital technologies, the use of big data, and artificial intelligence methods will open up new opportunities for improving scoring models and enhancing the quality of loan portfolios. Implementing these approaches will contribute to strengthening the financial resilience of commercial banks and the stability of the banking system as a whole.

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