Study on Operation Risk Management of Commercial Bank Small and Micro Enterprise Credit Business

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Keywords: Small and Micro Enterprises, Commercial Banks, Credit Business, Fuzzy Evaluation.

Abstract. Due to small and micro businesses have started late, small scale, insufficient funds, bank credit has become the main source of funding to promote the production and operation of the commercial bank. This article in view of the commercial bank small and micro enterprise credit business risk management this domain. According to the characteristics of commercial bank small and micro enterprise credit business process, the risk analysis is carried out, using analytic hierarchy process model to construct risk index system. On the basis of risk identification, risk assessment completed commercial banks Small and micro businesses credit business, the construction of fuzzy evaluation model, establish judgment matrix, finally come to the level of the risk. This research can enhance the small and micro enterprise credit service level, on Chinese commercial banks to control credit risk, explore new ideas of risk management has important reference and reference and practical significance.

Introduction

With the gradual development of the domestic market economy, the role of small and micro enterprises to promote the growth of the national economy is becoming increasingly apparent, the problem of small and micro enterprises financing difficulties also will be highlighted. In recent years, the research on Small and micro businesses financing problems of the domestic scholars have gradually increased, mainly from the angle of bank and enterprises themselves in two directions as the starting point. X. M. Li think small business and banking cooperation financing business is difficult, which greatly restricted the further development of small businesses [1]. Y. X. Chang on how to grasp the credit to small and micro enterprises interest rate pricing and strategy choice and security of commercial bank risk is the most commercial banks need to consider [2]. N Ling The status of small and micro enterprises in the survival of the current situation of small and micro enterprises are analyzed, and now the difficulties faced by small and micro enterprises than in 2008 when the financial crisis is more serious [3]. 2008 is the main external impact, F.L. Shang in the "2011 national small and micro businesses financial services evaluation" [4] pointed out, to further improve the small and micro businesses in financial services "four awareness". X.W. Jie pointed out that [5]small and micro businesses the capital chain is not smooth, the state-owned banks to risk large grounds rarely give small and micro businesses loans, private funds are difficult to place. Y.N. Li put forward, tailored for small and micro businesses financial service system, to reduce the small and micro businesses taxes [6]. Small and micro enterprises as the lifeblood of the micro circulation of the economy, the development of the national economy plays an important role cannot be ignored. Compared with large enterprises, small and micro businesses lack of financial system and governance structure, so that the information asymmetric is more severe [7].

As can be seen from the above, the main theoretical basis of these research results is asymmetric information theory; the theoretical model is more abstract and profound, lack of micro and micro enterprises financing difficulties of in-depth analysis. In this paper, the small and micro enterprise
bank credit financing the causes, present situation, the market structure of the banking, bank size, such as multi angle were studied.

**Operational Risk Analysis of Commercial Bank Small and Micro Enterprise Credit Business**

**Commercial Bank Small Micro Enterprise Credit Business Operation Process**

**Commercial Bank Small Micro Enterprise Credit Business Operation Process Framework**

The following business process framework as shown in figure 1 can be getting through the arrangement to existing process of commercial bank small and micro enterprise credit business. Then inductive analysis the risk of various stages and gets the risk element factor which pointed to clear.

![Business process framework](image)

**Operation Flow**

(1) Operation process before the loan can be divided into: loan application and acceptance, enterprise survey and evaluation and qualification examination and approval.
(2) Operating procedures in the loan: sign a loan contract and loan support.
(3) Operating procedures post loan: post loan management and loan recovery.

**Commercial Bank Small and Micro Enterprises Credit Business Operation Risk Identification**

**Commercial Banks Small and Micro Enterprises Credit Business Risk Identification and Selection**

According to the risk factors of commercial bank credit business and the construction principle of credit risk identification index system, combined with the latest research results at home and abroad. The index system is constructed by using the analytic hierarchy process.

This paper constructs the risk identification index system. It includes the borrower's credit risk, internal management risk, and market risk external regulatory risk.

**Importance Test of Credit Risk Identification Index**

Small and micro enterprises of commercial banks credit risk identification index system for testing, mainly in the following aspects:  
First, the concentration of extent. The formula is as follows:

\[
E_j^A = \frac{1}{k} \sum_{i=1}^{k} E_j n_{ij}
\]  

(1)
Where $E^A_j$ represents the degree of concentration which experts identify and evaluate on the J indicators, $E^A_j$ indicates the magnitude of the value of the j index to the level of importance of the i level, and $n_{ij}$ represents the number that experts evaluate on the j index for the i class.

Second, the dispersion of the degree. The formula is as follows;

$$\delta_j = \frac{1}{\sqrt{\sum_{k=1}^{k} n_{ij} (E_j - E^A_j)}}$$  \hspace{1cm} (2)

Where $\delta_j$ for the first j index, the experts on the evaluation of the degree of dispersion, with the above concentration index, if the evaluation is relatively concentrated, the delta $\delta_j$ value is small; otherwise, the delta $\delta_j$ is larger.

Third, the coordination of the degree. The formula is as follows;

$$V_j = \frac{\delta_j}{E^A_j}$$ \hspace{1cm} (3)

Which is the representation of $E^A_j$ expert evaluation index, $E^A_j$ value greater, index has become increasingly important, delta $\delta_j$ is the degree of concentration of the opinions from experts, and the value is smaller that the opinions of experts increasingly concentrated.

**Commercial Bank Small and Micro Enterprise Credit Business Operation Risk Assessment**

**Fuzzy Comprehensive Evaluation Model Construction Ideas**

![Figure 2. The Process Map of Fuzzy Evaluation Method.](image)

Fuzzy evaluation model by the factor set, reviews set, weight set, evaluation matrix of four elements, and use the level analysis method to determine the weights of each factor index, through the method of fuzzy clustering analysis on the evaluation results are classification analysis and comprehensive evaluation.

**Fuzzy Evaluation Matrix**

*The Fuzzy Operation of Evaluation Matrix of Index Layer*

The judgment matrix of evaluation model is constructed by using the method of constructing judgment matrix based on AHP. This paper can get the evaluation matrix of the four evaluation factors, as following:

$$a_{ij} = 1/a_{ji}$$ Where is $a_{ij}$ indicates the relative importance of the first I element to the j element.

$$A - B = \begin{bmatrix} 1 & B_1/B_2 & B_1/B_3 \\ B_2/B_1 & 1 & B_2/B_3 \\ B_3/B_1 & B_3/B_2 & 1 \end{bmatrix}$$ \hspace{1cm} (4)

$$B_1 - C_{(0-4)} = \begin{bmatrix} 1 & C_1/C_2 & C_1/C_3 & C_1/C_4 \\ C_2/C_1 & 1 & C_2/C_3 & C_2/C_4 \\ C_3/C_1 & C_3/C_2 & 1 & C_3/C_4 \\ C_4/C_1 & C_4/C_2 & C_4/C_3 & 1 \end{bmatrix}$$ \hspace{1cm} (5)
According to the judgment matrix we can calculate the weight of each index, and finally get the purpose of identifying the credit risk of commercial bank.

**Fuzzy Arithmetic for Evaluation Matrix of Criterion Layer**

Through the results of the last section, getting the evaluation matrix of the criterion layer:

\[
R = \begin{bmatrix}
0.1049 & 0.2369 & 0.3022 & 0.2258 & 0.1302 \\
0.1139 & 0.2305 & 0.3020 & 0.2172 & 0.1364 \\
0.2993 & 0.3202 & 0.2001 & 0.1388 & 0.0415 \\
0.1534 & 0.2585 & 0.2898 & 0.1988 & 0.0994
\end{bmatrix}
\]

(9)

Normalization process:

\[
V' = (0.1222, 0.2424, 0.2961, 0.2164, 0.1230)
\]

(10)

Analysis results show that in the evaluation of the overall commercial bank credit risk management and control, 12.22% of people think the "excellent", 24.24% believes that "good", 29.61% of people think "general", 21.64% of the people think "poor", 12.30% of people think "very poor". You can see, in "good" and "bad" two proportion was significantly lower in the outside, and the remaining three roughly the same, indicating that the commercial bank's overall credit risk control level should be in the secondary general level.

**Risk Assessment Results Analysis**

Through the results of the last section, we can get the following evaluation summary:

![Figure 3. Results Sketch Map of Fuzzy Evaluation Method.](image-url)

Figure 3. Results Sketch Map of Fuzzy Evaluation Method.

With S= (100, 80, 60, 40, 20) on the (excellent, good, general, poor, very poor) to assign, through the weighted average method can get the final score of the factors:
Table 1. Index score evaluation.

<table>
<thead>
<tr>
<th>Factor index</th>
<th>Borrower Credit Risk</th>
<th>Internal management risk</th>
<th>Market industry risk</th>
<th>External supervision risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>score</td>
<td>59.21</td>
<td>59.366</td>
<td>73.934</td>
<td>63.348</td>
</tr>
</tbody>
</table>

First, the commercial banks "market risk" the management and control best, the score reached 73.934, is close to good, which considered "excellent" and "good" accounted for more than 50%, and single index "good" accounted for ratio are all factors in the highest, the proportion of "poor" are all factors that accounted for more than the minimum.

Secondly, the commercial banks in the aspects of "the credit risk of the borrower" management and control of the poor, the lowest score, and that "good" ratio is only 10.49%, in all the elements of the indicators in the minimum, and relatively "poor" and "very poor" accounted for slightly higher.

Finally, compared to the "borrower credit risk", "internal management risk" and "external supervision risk" overall evaluation, there are some problems that need to be improved.

Summary

Aiming at the situation of small and micro enterprise credit risk management in domestic commercial banks, the loan process and exist at all stages of business risk the thorough analysis, the construction of risk structure; AHP method, provides an effective way for various risk factors identified in credit business, and through the fuzzy evaluation method, the risk factor of the size of the credit made an accurate assessment of risk management, provides a feasible and reliable theoretical basis for small micro enterprise risk management of commercial bank credit business, provides a new strategy for Chinese commercial banks to support the Small and micro businesses financing risk management.

References