Research on Credit Risk Evaluation In Commercial Banks In China

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Abstract. Credit loans of Chinese commercial banks have been increasing; however, the risk of loan default is also rising rapidly, and Chinese commercial banks have been paying more and more attention to the management of credit risk, and that leads to the commercial banks’ exploration of the credit risk evaluation. Moreover, data mining and mathematical statistics techniques are applied in credit rating, risk monitoring, and prediction of customer default risk.

Keywords: Credit Risk; Commercial Bank; Risk Evaluation.

1. Introduction

In 1988, the Bank of International Settlements issued the Basel Accord, which raised the requirements for risk management in the commercial banking industry to a new level. At the end of 2006, the New Basel Accord was implemented in the Group of Ten countries, which marks the era of comprehensive risk management in commercial banks. The New Basel Capital Accord includes market risk and operational risk, and covers three major risks, including credit risk, market risk, and operational risk. Commercial banks in China are also adopting the new methods in risk management such as VaR method and ES method, and yet risk evaluation is the first and most important step in risk management.

2. Literature Review

In the 1970s, some scholars launched the study of credit risk management, and did research on credit rationing from a microeconomic perspective[1]. By the 1980s, study on enterprise risk management mainly focused on the diversification and avoidance of investment risk and financial risk[2]. There appeared Markowitz's mean-variance theory[3], asset liquidity preference theory[4], and capital asset pricing model (CAPM)[5]. Diamond found that if banks keep track on the business operation of the borrowers, they can effectively avoid adverse selection, and it can prevent banks from credit risk[10]. These are all results of the study and research. Risk managers in commercial banks in China, especially those in state-owned banks, are also exploring credit risk evaluation while performing risk management.

3. Credit Risk Evaluation In Practice

3.1 Customer Rating Management

Customer credit rating is a superior method for evaluating and predicting customer risk from the customer dimension using data mining and mathematical statistics technology. It’s a significant link in the credit management process and a crucial means of risk control.

3.1.1 Customer Credit Rating

Customer credit rating refers to the process of analyzing, evaluating, and predicting a customer's risk of default due to changes in solvency, as well as determining the credit rating. Customer credit ratings are categorized into nineteen levels with increasing risk from level 1 to level 19. As is shown in Table 1.
### Table 1 Customer Credit Rating Characteristics Table

<table>
<thead>
<tr>
<th>Level</th>
<th>Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Excellent</td>
<td>The borrower's capacity to pay its debt is extremely strong, with minimal risk, and it is a pioneer in its industry.</td>
</tr>
<tr>
<td>2</td>
<td>Great</td>
<td>The borrower's capacity to pay the debt is very strong with little risk, and the customer is a leader in the industry category within China.</td>
</tr>
<tr>
<td>3</td>
<td>Good</td>
<td>The borrower's capacity to pay its debt is strong, with little risk, and it is a leader in a broad industry on a regional scale, with a small impact on its capacity to pay its debt due to unfavorable factors in the external environment and changes in economic conditions.</td>
</tr>
<tr>
<td>4</td>
<td>Better than average</td>
<td>The borrower's capacity to pay its debt is strong, sometimes its ability to pay its debt is affected by adverse economic conditions or the external environment, but the risk is low.</td>
</tr>
<tr>
<td>5</td>
<td>Average</td>
<td>Clients currently have sufficient debt pay capacity but may be vulnerable to adverse economic conditions or external circumstances.</td>
</tr>
<tr>
<td>6</td>
<td>Fair</td>
<td>The client has some capacity to repay its debt, but there is a high degree of uncertainty of instability or adverse business, financial, or economic conditions may prevent the client from repaying its debt.</td>
</tr>
<tr>
<td>7</td>
<td>Acceptable</td>
<td>The client is currently solvent, but adverse business, financial, or economic conditions may weaken the client's ability and willingness to repay its debts, with a high degree of uncertainty.</td>
</tr>
<tr>
<td>8</td>
<td>Concerned</td>
<td>The client is dependent on favorable business, financial, or economic conditions to repay its debt. Inability to repay debt if business, financial, or economic conditions deteriorate.</td>
</tr>
<tr>
<td>9</td>
<td>Poor</td>
<td>There is a very high probability that the customer will not be able to repay its debts, and the level of risk is high.</td>
</tr>
<tr>
<td>10</td>
<td>Breach of Contract</td>
<td>The customer is already in default, with an event of default as defined by the commercial bank's default-related regulations.</td>
</tr>
</tbody>
</table>

Customer risk limit is an estimation of the maximum solvency of a customer using risk measurement methods, which is an extension and application of the customer rating results. The risk limit is mainly used to prevent over-credit, and the actual amount of credit granted to a customer should not exceed this limit in. Customer risk limit refers to the maximum amount of credit to be granted by the commercial bank to a customer within a certain time (generally one year) in the future. Different risk limit calculation methods are adopted for different types of customers.

#### 3.1.3 Customer Default Management

Customer default management is an important way for commercial banks to summarize their risk management experience and improve the effectiveness of credit risk management. Default data is an important basis for the operation of the customer's internal rating measurement model.

#### 3.2 Risk Classification of Credit Assets

##### 3.2.1 Debt Rating Management

Debt rating is the process of evaluating the loss-given-default (LGD) rate of a debt and determining its rating. LGD ratio a proportion of the exposure to the defaulted debt item. Default risk exposure is the total amount of exposure to on and off-balance sheet items that would be expected in the event of a debtor's default.
1 Commercial banks' two-dimensional internal rating system

Debt rating is an important measure to improve the two-dimensional internal evaluation system of commercial banks' credit-granting business and to enhance the commercial banks' risk management ability. In the quantitative analysis of credit risk, probability of default (PD) and loss given default (LGD) are two indispensable factors, of which PD is usually derived from the evaluation of the debtor's solvency and willingness to pay and is used to measure the likelihood of loan default; LGD is used to measure the proportion of actual loss incurred after a loan default.

![Credit Risk Evaluation System](image)

**Fig. 1** Credit Risk Evaluation System

2 Application of debt rating

Debt ratings provide a basis for business marketing. Debt ratings can make up for the shortcomings of customer credit ratings that cannot fully reflect all credit risks. They are crucial factors in loan pricing. Accurate risk-cost estimation is a prerequisite for commercial banks to price loans reasonably. At the same time debt rating is the core of credit asset classification and loss provisioning. According to the formula.

\[
EL = LGE \times PD
\]

(1)

where EL is the expected loss rate, LGE is the quantitative index of debt rating, and PD is the quantitative index of customer credit rating.

3.2.2 Credit Asset Risk Classification

Risk classification of credit assets refers to the process of comprehensive, timely, and accurate evaluation of credit assets by commercial banks following prescribed standards, using reasonable methods and processes, and classifying credit assets into different grades according to the degree of risk.

Credit assets are categorized into twelve classes according to the degree of risk, as shown in the table below

<table>
<thead>
<tr>
<th>Name (12 Levels of Classification)</th>
<th>Code</th>
<th>Name (5 Levels of Classification)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass level 1</td>
<td>A1</td>
<td>Pass: borrowers are able to perform the contract, and there is no sufficient reason to doubt the repayment of the principal and interest of loans in full and on time.</td>
<td>Prime</td>
</tr>
<tr>
<td>Pass level 2</td>
<td>A2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pass level 3</td>
<td>A3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pass level 4</td>
<td>A4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special mention level 1</td>
<td>B1</td>
<td>Special mention: though borrowers are currently able to repay the principal and interest of loans, there are factors that may have an adverse effect on the repayment of loans.</td>
<td></td>
</tr>
<tr>
<td>Special mention level 2</td>
<td>B2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special mention level 3</td>
<td>B3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substandard level 1</td>
<td>C1</td>
<td>Substandard: borrowers’ repayment ability is apparently in question, and they are unable to repay the principle and interest of loans in full solely with their normal operating income; certain losses might incur even if collaterals are realized.</td>
<td>Non-performing</td>
</tr>
<tr>
<td>Substandard level 2</td>
<td>C2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Table of 12 Levels of Classification
3.3 Credit Risk Monitoring and Reporting

There are many tools for risk monitoring, such as the Credit Risk Monitoring System (CRMS), classification of credit risk assets, risk screening, and the use of public information. At the same time, inspection activities are carried out by commercial banks at all levels to identify and resolve credit risks on time, taking into account the characteristics of their businesses and the risks they face.

Timely reporting of significant credit risk events is an important element of risk reporting in the commercial bank’s comprehensive risk management system and is the link in the commercial bank's risk warning and asset quality control.

The credit risk management department need to improve the sensitivity and risk prediction ability for various types of major credit risk events, formulate the risk response plan in advance. Credit risk managers should be familiar with the conventional measures for risk mitigation and disposal and be able to preserve the commercial bank's assets promptly after the occurrence of a major credit risk event.

3.4 Portfolio Risk Management

Portfolio risk management is a new trend in commercial banks. The method is to control all kinds of risks as a whole and to implement proactive management of the asset portfolio, to balance risks and returns, and to seek to maximize the return on capital under the capital constraints.

Here are some application of portfolio risk management tools

1. Resource allocation

Under the constraints of scarce capital and limited resources, some of the customers’ needs cannot be fully satisfied, which makes the commercial banks face the problem in resource allocation, thus generating the problem of prioritization of customers by the commercial bank. Through economic capital allocation management, commercial banks take the initiative to optimize the structure of risk assets, tilting limited resources to customers and products with low capital consumption, low-risk weight, and superior operating efficiency,

2. Limit Management

The capital strength of a commercial bank determines the total amount of risk it can handle, and the setting and management of limits can effectively restrain risk exposure, which is of great significance to the sound operation of the commercial bank. The use of economic capital tools for limit management provides a quantitative basis for limit setting.

Concerning limit-setting methods, the portion of book capital greater than economic capital can be taken as the upper limit, and then the optimization model can be used to determine the specific limits for each dimension.

4. Conclusion

Credit risk management in commercial banks is a crucial aspect of ensuring the sound operation of the financial system, and credit risk evaluation is the cornerstone of the credit risk management. Through the research in this paper, we have provided an in-depth analysis of the key aspects of
credit risk evaluation in commercial banks, and we believe that credit risk evaluation in commercial banks can usher in a more scientific, efficient and sound development.

References


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