Analysis of Credit Risk Control for Small and Micro Enterprises in Chinese Commercial Banks: From the Perspective of Big Data Credit Reporting

Zhengkun Liu[1,*], Lingjie Wang[2]

[1]Nanjing Police University, No. 28 Wenlan Road, Nanjing, Jiangsu, China
[2]Agricultural Bank of China, Xiangcheng Subbranch of Zhoukou Branch, Zhoukou, Henan, China
[*]Corresponding author

Abstract: The Chinese government provides policy care and support for the financing development of small and micro enterprises, which has effectively alleviated the problem of financing difficulties for small and micro enterprises. However, from a longer time scale, objectively, small and micro enterprises inevitably have operational problems such as false financial information, operators' Moral hazard, and weak credit awareness. At the same time, China's commercial banks' credit business has flaws in the risk management mechanism, which directly leads to the difficulty in controlling the risk exposure of commercial banks' credit. Therefore, Chinese commercial banks have the motivation to develop and optimize the Big data platform based on small and micro enterprise credit reporting, to protect small and micro credit enterprises as the starting point, to enable traditional credit business with financial technology, to dynamically track and manage the entire line of credit business, and to reduce the risk of business breach.

1. Introduction

The research focuses on sorting out the current development status of credit business for commercial banks and small and micro enterprises in China, and points out that small and micro enterprises in China lack awareness of operating credit; The financial management system is not perfect enough; The overall business process and results are greatly affected by the external market, which further raises the rationality and necessity for commercial banks to use Big data to conduct risk management on credit business. Through in-depth research, it is found that measures and methods such as improving financial data integration, strengthening risk early warning mechanism, optimizing credit product design, strengthening Moral hazard of practitioners, and improving data information security can provide solutions for commercial banks to use Big data credit reporting system to develop small and micro enterprise credit business risk control, so as to better promote the healthy and orderly development of Chinese commercial banks.

Against the backdrop of accelerating the construction of a "dual circulation" new development during the 14th Five Year Plan period in China, small and micro enterprises, as the main force in

economic life, have achieved leapfrog growth in terms of economic aggregate and development quantity. At the same time, Chinese provincial and municipal governments at all levels have successively introduced financing support policies for small and micro enterprises to ensure their sustainable development. As an important financing carrier, commercial banks mainly use the goodwill of small and micro enterprises as evaluation criteria to provide credit loans, which leads to the accumulation of credit risks in commercial banks. Therefore, the importance and necessity of controlling internal credit risk management in commercial banks have been put on the agenda. At present, on the one hand, small and micro enterprises have poor resistance to external market risks, and their internal financial and tax management is not standardized. Commercial banks have to face complex and diverse business risks; On the other hand, the intelligent application of Big data credit reporting by commercial banks is still in the initial stage, and it is still difficult for commercial banks to fully exert their risk control effectiveness in the credit business field. Therefore, for commercial banks, comprehensively improving their risk control ability is the focus of their own development and transformation. Focusing on risk control of small and micro credit and using Big data of credit investigation to curb the credit risk of loans has become an inevitable demand for their own development.

At present, the development of Big data technology is increasingly mature, which brings opportunities for commercial banks to give full play to the advantages of Big data credit investigation in the credit risk control of small and micro enterprises. First of all, under the Big data, ease the credit reporting problem, help the bank build a whole process credit risk control system, and balance the efficiency and cost of risk control [1]. Secondly, Big data credit reporting can effectively prevent enterprise loan risks, improve business handling efficiency, and serve the capital needs of small and micro customers, thus driving regional economic development. Finally, commercial banks utilize data platforms to fully explore and analyze customer information, comprehensively improve enterprise credit data, and motivate enterprises to abide by their promises, which has long-term significance for the in-depth promotion of China's credit system construction.

In the existing research literature, more and more Chinese scholars have conducted in-depth research on credit risk management of small and micro enterprises, but these studies mainly focus on the promotion of Big data credit in information mining, identifying customer default risk and other aspects of credit risk control, and the application efficiency of Big data credit risk control for commercial banks is not high. More attention should be paid to making full use of the organic combination of credit Big data and risk control platform to enable commercial banks to carry out systematic and efficient whole process risk management for small and micro enterprises, including accurate identification of customers, pre loan business review, post loan daily supervision, etc. As far as the current research results are concerned, there is less research on the characteristics of commercial banks and small and micro enterprises by Chinese scholars, and the Big data credit risk control based on credit business is still in the stage of theoretical improvement. Based on the actual situation in China, this study proposes strategies suitable for Chinese commercial banks to optimize and improve the credit risk control of small and micro enterprises under the scientific and technological empowerment of Big data credit reporting, so as to promote mutual benefit and win-win between banks and enterprises.

This paper aims to take Big data credit reporting as the starting point, fully explore the advantages of using this platform's technology to control the credit risk of small and micro enterprises, and combine the structural problems faced by commercial banks in the actual credit business, propose solutions to optimize risk control, thus making the risk control effectiveness of commercial banks more significant, improving asset quality, and helping banks and enterprises develop steadily.

2. Analysis of the Current Situation of Credit Business for Small and Micro Enterprises in Chinese Commercial Banks

2.1. The Development Status of Small and Micro Enterprise Credit Business in Commercial Banks of China

2.1.1. Overview of Credit Business Risks in Commercial Banksaper Title

The credit risk of commercial banks is one of the main risks facing the development of comprehensive loan business. Stiglitz and Weiss (1981) pointed out that the core problem of credit risk management of small and micro enterprises is Adverse selection caused by the asymmetry between commercial banks and their information, and Moral hazard between operators and credit granting staff [2]. From the perspective of objective development, China's overall Economic restructuring rapidly, external uncertainties such as the Sino US trade war, the local war between Russia and Ukraine, and the COVID-19 have increased significantly, the global financial market is also complex and volatile, and China's economic operation has greater downward pressure. From the perspective of the business indicators of commercial banks, the balance of non-performing loans and non-performing ratio have increased significantly, and the risk of credit business has increased exponentially. Therefore, the credit risk of commercial banks has received unprecedented attention and attention. According to the "2022 Major Regulatory Indicators of Commercial Banks (Quarterly)" published on the official website of the China Banking and Insurance Regulatory Commission, Table 1 shows that as of the end of 2022, the balance of non-performing loans of commercial banks was 2.03 trillion yuan, an increase of 0.32 trillion yuan compared to the end of the previous year; The non-performing loan ratio of commercial banks was 1.83%, an increase of 0.09 percentage points compared to the end of the previous year. It is worth noting that in recent years, the non-performing asset ratio of commercial banks has remained below 2%, but it also shows that the scale of non-performing assets is increasing. This indicates a deterioration trend in the quality of credit assets, an increase in credit risk for small and micro enterprise credit, and an increase in difficulty in risk control. Zveruk and Ivanyuk (2017), Mbiti et al. (2018) believe that improving the quality and efficiency of bank credit risk management requires improving the process, organization, and legal basis of bank credit business, emphasizing the role of comprehensive risk management strategies for commercial banks [3-4]. Therefore, it is necessary for commercial banks to increase their emphasis on credit risk control, prevent small and micro credit risks, strengthen the weak links of the real economy, and promote the long-term and stable development of small and micro enterprises.

Table 1: Non-performing loans of commercial banks from 2019 to 2022

Unit: trillion yuan, %

	2019	2020	2021	2022
Commercial bank non-performing loan balance	1.27	1.51	1.71	2.03
Commercial bank non-performing loan ratio	1.67	1.74	1.74	1.83

2.1.2. Overview of the Development of Small and Micro Enterprise Credit Business

Commercial banks, based on the goal of controlling credit risk, have often favored large and medium-sized enterprises with clear business directions, stable operations, and long-term stable returns for a considerable period of time. Commercial banks have deeply expanded their loan business in many large and medium-sized enterprises in China, and are already in a relatively saturated state. At present, there is a vast market for commercial banks to develop small and micro

loans, which is clearly a promising area. It is expected that more commercial banks will increase their investment in small and micro credit business in the future.

The credit market for small and micro enterprises in China is still a blue ocean. According to the "China Small and Micro Enterprise Financial Services Report" released by the People's Bank of China and the China Banking and Insurance Regulatory Commission, the statistical results show that as of the end of 2022, the balance of corporate loans for small and micro enterprises in China was 26 trillion yuan, an increase of 1.7 trillion yuan for the whole year, and the growth rate was 0.1 percentage points higher than the end of the previous year [5]. As shown in Table 2, the important traction role of policies is becoming an accelerator for the development of small and micro enterprises, and has achieved certain results in solving the financing difficulties of small and micro enterprises. Small and micro credit has good development prospects.

Table 2: Loan situation for small and micro enterprises from 2019 to 2022

Unit: trillion yuan, %

	2019	2020	2021	2022
Loan balance for small and micro enterprises	17.39	20.84	24.3	26.2
Proportion of small and micro enterprise loans to enterprise loans	31.2	32.1	33	32.1

2.2. Analysis of Credit Risk Reasons for Small and Micro Enterprises

2.2.1. Lack of Corporate Credit Awareness

Small and micro business owners believe that the size of the enterprise is small and their awareness of goodwill is weak. They subjectively believe that loan default has limited impact on shareholders and operators. In particular, when business owners apply for credit loans from commercial banks, their exposure to Moral hazard becomes larger, and the business information they provide is flawed. They deliberately avoid business risks, exaggerate the management ability of operators, selectively optimize the current situation of industry operations, and have a weak legal awareness. Business owners are willing to risk fraud, when applying for a loan, commercial bank credit employees intentionally conceal relevant risk information. They lack the ability to distinguish and believe that the main purpose of credit loans is for loan applicants to invest them in projects with good returns and no risks. There are also a small number of business owners who violate the spirit of the contract, disregard corporate credit, and even violate the law, transferring targeted loan funds for other prohibited purposes. For example, forging business records and exaggerating the company's operational capabilities and qualifications; Counterfeiting property rights documents to increase the credit limit of commercial banks as collateral assets; Mortgaging fixed assets to other commercial banks, repeatedly pledging to obtain credit qualifications, etc. Therefore, small and micro enterprises are lack of credit awareness. When they are affected by adverse factors and have difficulty in operation and management, and are insolvent, they come up with ways to apply for bankruptcy to avoid debt. All these make Moral hazard difficult to control, and seriously affect the recovery of commercial banks' loan funds [6].

2.2.2. The Financial Management System of the Enterprise is Not Sound

Small and micro enterprises are mostly private enterprises, with a small scale. Their internal operational management structure is not scientific, and the responsibilities of employees are not clear. Furthermore, the personnel responsible for financial work are not highly professional, and the phenomenon of non-standard and imprecise accounting is extremely common, resulting in

incomplete accounting information and a lack of complete financial data records in many small and micro enterprises. In the end, the financial statements provided by enterprises also lack authenticity and credibility, and small and micro enterprises lack an appropriate financial management system, usually family management. The existence of financial systems is only a formality and cannot play its practical role in constraining and supervising. Disordered accounts and false information are a common phenomenon. When conducting small and micro credit business, commercial banks find it difficult to clearly understand and judge the authenticity of enterprise operations and financial conditions, which can easily lead to risks.

2.2.3. Highly Influenced by the Market Economy Environment

Small and micro enterprises have no competitive advantage compared to large and medium-sized enterprises, and when the macroeconomic situation and industry cycle change, enterprises are greatly affected and have a shorter life cycle. When the economy goes down, it will impose certain constraints on the operation and development of small and micro enterprises, and interfere with their normal financing ability, financial status, and other activities, making repayment sources unreliable. In the complex and ever-changing market economy environment, once hit by a certain unexpected event, small and micro enterprises cannot withstand risks, encounter operational bottlenecks, lose sustained and stable cash flow, and reduce operating income, they will be unable to repay within the agreed deadline. Faced with this situation, small and micro customers have a significantly increased likelihood of loan default, increased credit risk, and increased difficulty in post loan management for banks.

3. Necessity for Commercial Banks to Use Big Data to Develop Small and Micro Enterprise Credit Business

3.1. Helps Improve Risk Identification Capabilities

The source of good risk control for banks is to ensure the accuracy and completeness of data, and high data quality is very beneficial for banks to accurately grasp risks. From a credit reporting perspective, the information asymmetry between banks and enterprises caused by the imperfect credit reporting system has given rise to small and micro credit risks. At present, most commercial banks mainly look at the prescribed application information submitted by small and micro customers, customer business data held internally by the bank, credit reports provided by the People's Bank of China, and other external data when reviewing credit information. This information is scattered and the acquisition process is cumbersome. Under the Big data credit reporting mode, the information covers a wide range, and can effectively collect information from various departments, including small and micro enterprises' operating income, tax payment, finance, water, electricity, justice and other information. By integrating and analyzing data from various channels, it is possible to largely avoid relying solely on a single enterprise's financial statement information for approval. By transforming the data into indicators for measuring risk, banks can more conveniently obtain the true status of the enterprise from multiple perspectives, enabling information exchange between banks and enterprises, providing great help for commercial banks to accurately identify small and micro risk information, and improving the level of credit risk identification [7].

3.2. Helps to Strengthen Risk Control Levels

Helps improve the efficiency of credit business processing. When the development of credit risk

control stopped, the innovation of Big data credit investigation opened new ideas for commercial banks. Utilize the advantages of the credit Big data platform to comprehensively analyze credit and risk information, show the possibility of enterprises to comply with the deadline to repay loans, and its development trend, break the limitations of banks' incomplete information review of small and micro credit customers, and improve the accuracy of loan decisions. In addition, through the Big data risk control platform, the authenticity and risk points of enterprise data are accurately screened, small and micro credit customers are strictly controlled, and the Moral hazard of customer fraud and concealment of information in traditional business review is excluded as far as possible. As of May 2019, the non-performing loan rate of small and micro enterprises in China with single household credit less than 10 million yuan was 5.9%[8]. While some Internet banks choose Big data risk control when carrying out credit business, their non-performing ratio is only about 1%. In view of this, it is the general trend for commercial banks to implement the application of Big data and cloud computing and establish accurate quantitative risk models and risk control systems. The Big data credit reporting platform focuses on the business indicators of enterprises and the use of funds, and monitors the changes of enterprises before, during and after loans in real time. This is beneficial for commercial banks to quickly assess, warn, and respond to risks, avoid excessive losses of bank funds, and comprehensively improve their ability to intelligently analyze and quantify risks, truly achieving comprehensive monitoring and control of risks in every aspect of the entire process[9].

3.3. Helps Improve the Efficiency of Credit Business Processing

The handling of traditional small and micro credit business needs to go through a tedious process, and it is only after the business personnel complete a series of businesses such as due diligence report and loan approval that they can determine whether to approve loans. Big data risk control fully automates the review of information, avoiding the impact of human subjective consciousness. Through the credit Big data to describe the risk of small and micro customers, banks can quickly obtain enterprise credit rating information, approval results and loan suggestions [10]. On the one hand, this saves a lot of labor costs in the past, eliminates the problem of information omissions during loan approval, as well as the risk of human error, and improves the level of refined risk control. Through the Big data credit reporting platform, the social security data, tax, education, water and electricity and other public data of all departments are collected to realize information sharing, which can quickly and effectively identify customers for review, evaluation and supervision, reduce the complex process of collecting information under the traditional mode and the cost of loan supervision, and reduce the possibility of default; On the other hand, the simplification of credit business processes has been optimized to help banks improve business efficiency and enhance customer credit service experience, enhance risk control level and regulatory efficiency, and achieve online automatic approval decision-making and real-time risk monitoring as a risk control method [11]. For example, Ping An Bank has launched an intelligent credit product for self-service across the line. Relying on the Big data platform for fully automated model approval, it can quickly and accurately complete risk assessment, which not only provides loans to small and micro enterprises, but also reduces its own workload and improves service efficiency.

4. Commercial Banks Use Big Data to Develop Credit Risk Control of Small and Micro Enterprises

4.1. Low Data Integration

The government data required by current commercial banks is not easily accessible. The key to

Big data credit reporting is data sources, but there is still a lack of special Big data credit reporting platform to provide support for small and micro credit risk control, and it is unable to capture the changed information in time to reflect the development of small and micro enterprises [12]. The sources of bank credit Big data include the data resources held by the third party, banks, central bank credit bureau and the government. However, in most regions, some data has limited openness and it is difficult to communicate data from various channels, which is also a data pain point faced by the vast majority of banks. For example, relevant departments such as industry and commerce, human resources and social security, and courts have data on taxation, social security, and compliance with laws and regulations, which are of great help to banks. However, for the sake of maintaining data security, the government is not open to society, which makes it difficult for banks to access it. This type of data is still scattered across various departments, forming data barriers, and it is impossible to determine the quantity and quality of government data that commercial banks can intervene in. It cannot be used legally and compliant, becoming a "scarce" resource that banks cannot access.

Commercial banks face high costs when integrating data from various dimensions, and the intrinsic value of the data cannot be effectively utilized. The scope of credit data of small and micro enterprises in commercial banks will gradually expand in depth. Big data risk control requires that the valuable information be effectively used on the basis of massive data. Commercial banks still face difficulties in data aggregation. To solve this problem, we need to use Big data technology to create a mature credit data platform to achieve full coverage of information channels, but this is not achieved overnight. During construction, the time and cost of data retrieval are relatively high, including the need to invest human resources with rich skills and high requirements to cooperate with data, funds, technology, and scenarios. The construction time is long and the return effect is poor. In addition, the integration of data in all dimensions must involve the interests of multiple platforms, resulting in higher Big data credit reporting costs. It is also difficult to establish a balanced model for this, which to some extent also affects the progress of data docking between various departments and commercial banks [13].

4.2. Incomplete Risk Warning Mechanism

Effective risk warning requires fast data change speed and powerful model analysis capabilities, which cannot be fully achieved in the short term, resulting in untimely post loan risk warning. At present, some small and medium-sized banks are unable to achieve automatic and comprehensive supervision and early warning of risks in the front and back stages of credit business due to various limitations such as a lack of professional personnel, insufficient technical conditions, and high construction costs. Under the risk control environment of Big data credit reporting, commercial banks' post loan risk management and control of credit business are: first, the customer manager visits the site on time to conduct post loan detection; second, according to the early warning signals sent by the Big data risk management monitoring and early warning system, they timely understand the enterprise's transaction data in the bank, whether the use of credit funds has entered the prohibited industry, whether the People's Bank of China has bad records in credit reporting and other information. Commercial banks currently have limited knowledge of tax, judicial, and other credit assessable data, which is highly likely to result in the loss of key risk information. The development of small and micro enterprises is unpredictable, and relying solely on the current level of early warning work, there is often a lag in tracking the dynamic data of these transaction channels of small and micro enterprises, which cannot update the changing information in real-time to complete risk warning. From this perspective, in order to achieve more efficient risk warning and promote risk prioritization, the platform still needs to be continuously constructed and improved.

If the warning is not timely, the effectiveness of risk management will also be poor. Incomplete collection and poor quality of current credit Big data restrict the full play of early warning effectiveness. When there are obvious overdue issues in small and micro loans, it is only then that they realize that there are problems with customer credit, difficulties in business operations, and insufficient funds. At this time, it is too late to send out risk signals, which not only fails to prevent and control risk events early, but also shortens the time for risk disposal. Especially when small and micro enterprises face unexpected events, their operating conditions rapidly decline, leading to data lag and information asymmetry. When screening customer risk information, not responding quickly can affect the bank's risk control effectiveness. The risk control of commercial banks involves many departments and personnel, and in the event of delayed warning, the disposal process becomes more cumbersome, increasing the cost of disposing of non-performing assets in banks. The credit risk early warning mechanism still needs to be improved and perfected. Commercial banks should engage in post resolution and pre warning. Through the Big data risk control platform, they can accurately identify risks, intelligently warn risks and prepare risk disposal strategies in advance.

4.3. Credit Products Based on Big Data Need to be Improved

The types of small and micro enterprises in China are gradually becoming more diverse, and the number of small and micro credit customers in commercial banks has also increased. However, the problem of single credit business products has also emerged. At present, the data dimensions of commercial banks are not yet rich, and the scenarios involved in credit products are relatively narrow, and credit service products have not yet been accurately tailored to the needs of enterprises in different industries. Especially for some easily overlooked long tail small and micro enterprise customers, the lack of credit data makes it difficult for banks to verify their operating costs, business flow, and consumer customer group types, resulting in low availability of credit products. Credit products for small and micro enterprises still lack integration with various scenarios. For example, Bank of Jiangsu's Big data credit loan product "tax e-finance" is generally applicable to small and micro enterprises with good tax paying behavior, but some start-up small and micro enterprises' applications are temporarily restricted.

The threshold of various Big data credit products is low, but there are also hidden risks. With the in-depth application of Big data credit reporting, commercial banks have changed their focus on small and micro loans from mortgage and guarantee to online credit loans. This has also become an ideal choice for small and micro financing. For small and micro enterprises that have relatively stable operating income and transaction flow, and have no bad information in the credit records of departments such as industry and commerce, taxation, and the People's Bank of China, they are generally willing to apply for online credit loans with relatively loose conditions. However, in recent years, the construction of the credit information sharing system is still lacking, and it is difficult to measure the credit level of these small and micro enterprises. At the same time, because Big data credit investigation has not been carried out for a long time, commercial banks do not properly check customers when screening and determining target customers through Big data credit investigation, which is prone to risk loopholes [14]. At this point, if small and micro enterprises meet the conditions and pass credit approval, weak credit awareness and concepts will inevitably reduce the default cost of the enterprise, and the willingness to repay will also be affected. Once the enterprise defaults, it will undoubtedly increase the economic cost of bank post loan credit risk management.

4.4. Low Business Ability of Credit Staff

One thing that cannot be ignored by domestic commercial banks includes the lack of support

from Big data risk control talents. Big data credit risk control links from precision marketing, credit approval, risk assessment, loan supervision to post loan risk disposal are all based on the integration and analysis of corporate tax payment, justice and other data. To truly exert the value of credit Big data in business processes and risk control models, this requires bank credit personnel to master credit business knowledge, be familiar with credit business processes, be clear about credit business risk points, and technically require them to have professional data mining technology and modeling ability, and use computers, Big data and other technologies to do a good job in the construction of risk control models and the research and development of Big data credit products. Due to the lack of data, talents and customers in some small and medium-sized banks, it is difficult to master the independent Big data risk control ability, and instead use the risk control model of external Big data companies to control their credit business. But in the long run, this model will pose a risk of customer data leakage for banks, and it is also not conducive to developing suitable and distinctive credit products for oneself. Therefore, commercial banks still need to cultivate comprehensive risk management talents with both business capabilities and technology to build differentiated and distinctive independent professional risk control systems.

Banks need to fill the gaps in the ability of business personnel to control Big data. Compared with traditional offline credit products, small and micro Big data credit products reduce the dependence on financial information and collateral, and pay more attention to Big data of credit reporting such as banks, governments, and third parties to judge the credit and risk status of enterprises. These information plays an important role in the starting point of credit risk control - risk identification [13]. However, at present, the business quality of the bank's credit personnel is somewhat lacking: on the one hand, the bank does not have a deep understanding of the business focus of Big data credit products, and is prone to errors in the business processing process, resulting in potential risks. The bank's credit business level and risk control ability still need to be improved; On the other hand, some small and medium-sized banks lack a mature risk control platform, so they can't combine their own Big data resources with other credit data for the time being to comprehensively analyze customers, leading to a decline in risk control effect. Therefore, this requires business personnel to be proficient in using the system and possess strong data mining capabilities, timely obtaining dynamic data, which helps to improve the bank's risk identification and regulatory capabilities.

4.5. The Management System for Data Information Security Needs to be Improved

The risk of credit information being stolen can also bring a lot of inconvenience to customers. Big data credit reporting includes massive data, many of which are of great significance to bank risk control, so ensuring data security is also a top priority. In the past year, private information leakage and illegal data theft by Big data crawlers triggered by Internet loan business exposed the security and risk problems of bank credit Big data, which had to draw the attention of banks to information. The security of data information inevitably has risks due to improper protection. When obtaining data, sometimes without the customer's permission and the clear authorization of the data owner, they collect their own bank account and transaction information. When involving the interaction of credit Big data, effective isolation measures for sensitive data are omitted, and encryption is not performed. If there is illegal crawler business, hidden dangers of privacy disclosure are likely to occur. The source, use, storage, quality, and other details of data are all related to information security. Ensuring the legitimacy of data sources and strictly preventing data security can further optimize credit risk control.

The security protection of the banking system is insufficient and there are security issues. For some small and medium-sized banks, due to their insufficient building capacity, they generally need

to connect data and risk control systems with the third-party Big data credit reporting companies. However, due to the lack of strict system management and technical security protection measures, data processing, transmission and application lose security and accuracy, and personal information protection has been omitted. Once the data information in Big data credit business is obtained by a third party, malicious and illegal use will cause serious interference to customers. For example, when the business needs to download the information of the credit Big data platform to the client, such as unauthorized access to the platform, malicious file transmission, and web page vulnerabilities, customer information will be leaked. Therefore, we should strengthen the research and development, operation and maintenance of the system, prevent information from being stolen and leaked, and realize the traceability of Data breach events and the risk level analysis of business data, so that we can start with data to carry out higher quality risk control.

5. Countermeasures for commercial banks to improve credit risk control of small and micro enterprises by using big data credit information

5.1. Conclusions and recommendations Strengthen the effective integration of various data and promote the application of Big data

Improving the credit risk control system of commercial banks cannot do without the support of data resources. The government should coordinate with various departments to actively cooperate in completing data integration. The government closely follows the guidance of the policy, cooperates with relevant units to promote the construction of enterprise credit information sharing system, and breaks down the information barriers of the government and banks [15-16]. Local governments should take the lead in using Big data technology to focus on the orderly integration of local social security payment, housing provident fund, tax payment, judicial decisions and other information on the basis of ensuring data security, deepen cooperation with finance, taxation, courts and other departments, build a special Big data financial service platform for credit reporting, and open it to commercial banks in a unified way. Banks will then connect with the local government Big data center, integrate and apply the credit data of small and micro enterprises, and overcome the barriers of information asymmetry. And on the basis of data resource connectivity, commercial banks screen and mine valuable Big data, deeply use credit Big data to portray a complete risk profile for small and micro enterprises, and help themselves to obtain unique regional market advantages. At the same time, Information science uses real-time updated data to judge the risk status of customers in the credit business process, optimize the small and micro credit service process, and strictly control risks. This reduces the credit risk that banks may face due to the inconvenience caused by a single data dimension in evaluating the credit of small and micro enterprises.

For some commercial banks with limited conditions and unable to manage data and control risks independently in the short term, they can also choose to cooperate with the compliant Big data credit reporting financial service platform to appropriately reduce the pressure on construction costs. One is that commercial banks integrate their own data resources and business advantages with financial service platforms, building a bridge for information integration between small and micro enterprises and commercial banks, and more efficiently centralizing credit data and mining its intrinsic value. The second is to collaborate with third-party service providers to build an intelligent risk control model system that meets their own requirements, promoting their own transformation from complexity to simplicity in risk control system construction and other technical aspects. This enables them to select high-quality customers through in-depth analysis of data, reduce risk management costs, strengthen their own risk control capabilities, and enhance risk control effectiveness. Of course, thanks to the consultation and technology provided by Big data management service providers, banks can also conduct data management and credit product

innovation at a lower cost, so as to achieve high-quality credit services.

5.2. Strengthen dynamic tracking and management of enterprise data, and strengthen credit process control

Establishing and improving real-time automatic warning mechanisms is also a key task for controlling credit risks. First, the decision analysis system of Big data credit investigation is used to portray the image of risk customers, refine the risk characteristics of enterprises, comprehensively grasp the effective information of credit enterprises, and dynamically monitor the data quality in real time, creating favorable conditions for the realization of high-precision risk early warning. Secondly, build a whole process real-time monitoring and early warning platform driven by Big data of credit information, and achieve accurate and intelligent risk early warning with multi-dimensional data. A comprehensive indicator system for monitoring and warning risks should be established, including information on the economic income, profit and loss status, account transactions, fund usage direction, and credit status of small and micro enterprises. The indicators should be continuously monitored, real-time tracking of whether there are abnormal data and default indicators, identification of risk points in the process, and timely monitoring of detailed risk information of credit customers based on warning signals [17]. Finally, continuous improvement should be made in the use of risk warning systems to enhance banks' ability to quantify risks and form a sound and reasonable risk warning system, laying a solid foundation for preventing and handling credit risks of small and micro enterprises.

We should strengthen the full process control of risks. Commercial banks should first conduct a rigorous credit review before lending, screen out risky customers based on the credit risk warning system, and reduce the burden of post loan management work such as overdue loan collection and clearance by the post loan management department [18-20]. Once again, when the early warning system sends out risk signals, management personnel should promptly arrange on-site inspections, form disposal plans based on inspection reports, and contact and remind loan customers to take preventive measures to reduce bank credit losses. For small and micro credit customers who have defaulted, the information of borrowers and associated persons can be found by using Big data of credit reporting, which facilitates the collection work of risk control personnel and helps the timely completion of loan collection. At the same time, offline supervision should be combined, and relevant staff should regularly conduct on-site inspections after loans to constrain customers' compliance awareness and repayment willingness, urge borrowers to repay on time, and reduce the possibility of overdue payments. The automatic monitoring and early warning, repayment reminder and other functions in the risk control platform driven by Big data will work together with the offline supervision to strictly control the risk in every link of credit, so as to develop low-cost and efficient risk control simultaneously.

5.3. Further improve the design of Big data credit products and strengthen product innovation

Commercial banks should actively explore the application scenarios of credit, utilize the current policy guidance conditions, actively innovate small and micro credit products, and focus on the coordinated development of online and offline products. At the same time, we should clarify the purpose of the loan, and actively negotiate with external institutions to promote multi field cooperation, expand coverage scenarios, and further extend the customer service path for small and micro enterprises in commercial banks based on the actual needs and differentiated loan purposes in business development of various industries. For example, China Construction Bank uses data on electricity payment by enterprises to analyze their business capabilities and credit status, and

develops an online credit loan product called "Cloud Power Loan" suitable for small and micro enterprises. Commercial banks should integrate Big data credit reporting with multiple scenarios, design differentiated credit products according to the different characteristics of small and micro enterprises in various industries, and promote the development of financial products in a safe and efficient direction.

Commercial banks should strictly control the customer quality of credit products. There are many uncertain factors that affect the operational status of small and micro enterprises, and small and micro enterprise customers generally apply for credit products because they cannot turn over their funds, resulting in a higher likelihood of enterprise default. Therefore, in order to control risks, commercial banks should, on the one hand, rely on the credit Big data risk evaluation model to accurately screen high-quality customers with strong repayment willingness and good credit awareness, and closely track the payment on time and the real operation of small and micro enterprises based on the multi-dimensional data of small and micro enterprises covered by the credit platform. Small and micro enterprises with development prospects should be actively supported; Refuse credit for enterprises that do not meet the conditions. On the other hand, some small and micro enterprises have good credit records and no abnormal transaction data in their own banks. This group of customers should also be considered, and providing credit funds to these potential high-quality customers can focus on controlling credit risks at every stage [21]. We should combine big data with traditional risk control mode, filter borrowers with insufficient repayment ability, and then provide such low threshold credit loans to appropriate target customers, so as to avoid possible risks in the credit business process at the source to the greatest extent, and improve the efficiency of risk control.

5.4. Improve the professional level of credit personnel and strengthen the construction of versatile talents

While strengthening data capacity building, commercial banks should attach importance to training and introducing compound talents with both Big data technology and banking business, which is also an indispensable task for commercial banks to improve their credit risk control ability by using Big data credit investigation. Commercial banks should do a good job in cultivating talent teams, actively introduce Big data professional core talents, and gradually build a professional Data modeling analysis team. Then use new technologies and new ideas to fully tap valuable customer data and better achieve risk management and control based on Big data of credit reporting. For colleges and universities, they should continue to increase investment, encourage the mode of cross professional training, encourage students to combine Big data risk management theory with practice, and actively provide professional talents for commercial banks. We should focus on promoting the integration of emerging technologies and finance majors, enabling technology personnel to master basic financial knowledge and understand banking business, enabling financial industry personnel to master basic technical skills and qualities, forming internet thinking, and creating comprehensive talents with data processing analysis and model research and development capabilities, providing important talent support for business development and risk control management [22-23].

We should strengthen skill training for employees within the industry. In addition to external introduction, commercial banks should also consider the training of internal staff, which can further cultivate potential Big data skilled personnel among those who have credit knowledge. We should combine big data credit reporting with business scenarios for specialized and professional training. Specifically, it includes expanding the staff's processing and analysis skills of credit Big data through Big data application skills training for business personnel, which is more in line with the online development trend of banking business. Through credit business training, business personnel

should strengthen their awareness of small and micro Big data credit products, so as to find loopholes, improve the system and products, promote the effectiveness of decision-making, and enhance the ability to use credit Big data for risk management and control. Through behavioral quality training, we continuously improve the risk prevention and control awareness of relevant personnel when operating the business, and strengthen the supervision of business personnel to ensure that compliance internal controls are implemented in place. As a result, the barriers between bank credit specialists and Big data credit technicians will be broken, so that some business personnel can also have the ability to make good use of Big data analysis, and then be able to strictly control the operational management standardization of commercial banks and the data mining and analysis of risk control links, laying a good foundation for the implementation of credit risk control of small and micro enterprises.

5.5. Strengthen the security management of enterprise Big data

Commercial banks and credit data collection departments should attach great importance to the protection of information security, optimize system protection functions, and prevent unnecessary risks. First, internal departments should build a multi-level security defense line for information management, strengthen the construction of their own credit Big data platform system security, implement risk prevention and control at different levels, set system access rights for users according to business needs, implement a more secure and efficient authentication mechanism, prohibit unauthorized operations, and form a system of mutual supervision and restriction of business personnel. Secondly, it is necessary to strengthen the protection of data transmission, storage and use, ensure the security of data flow in the above links, and strengthen the construction of Supervisory control on user behavior and data security, including the functions of restricting system download and web page copy, desensitizing credit data information, hiding key identity information, and encrypting important business data and sensitive data, Prevent malicious theft and attacks such as illegal violations. Finally, it is necessary to strengthen information security and abnormal query monitoring, dynamically monitor data in real-time, regularly check system vulnerabilities and maintain updates, optimize automatic processing processes, improve emergency plans, and fully improve risk control efficiency.

Commercial banks should strengthen data security management and privacy protection. In order to promote credit Big data to play its advantages in risk control of small and micro credit, it is also urgent to solve the problems of Big data in customer privacy, information security and other aspects. First, commercial banks should actively participate in the formulation of data security management laws and regulations, strengthen the system construction in data collection, processing, use, supervision, etc., ensure data security, clear sources, and take precautions to prepare a comprehensive mechanism for immediate notification of Data breach and emergency response plan in advance, so as to effectively improve the security of Big data management. The second is to increase the punishment on cross-border illegal collection and use of customer credit data, increase the cost of illegal crawlers, and thus improve the Big data environment. Third, when cooperating with Big data credit financial service providers, commercial banks should strictly confirm data security standards and have authorization. Balancing the interests and demands of data information providers, data collection and processing parties, and data users, forming a good data flow channel, conducting business legally through a sound information sharing mechanism, and striving to reduce the probability of risk occurrence.

6. Conclusions and Recommendations

This paper describes the current development of small and micro credit, and expounds the

significance and role of risk control of small and micro credit by using Big data credit reporting. In order to promote commercial banks to achieve better risk control effect in the context of Big data credit reporting and meet the increasing financing needs of small and micro enterprises, corresponding solutions are proposed.

By analyzing the problems of Big data credit risk control in data integration effect, risk early warning mechanism construction, small and micro Big data credit products, credit staff skills and enterprise credit Big data security, combined with theoretical and practical analysis, the following countermeasures are proposed for commercial banks: under the guidance of the government, we should cooperate with credit big data platform, expand the scope of data acquisition, and comprehensively promote the construction of credit big data system. And we should establish a real-time automatic warning mechanism, use dynamic data to monitor risks throughout the entire process, strengthen risk identification capabilities, and reduce risk disposal costs. It should innovate multi scenario fusion products, strictly control the quality of credit customers, and reduce risk hazards. Also we should establish and train a comprehensive professional talent team to provide important talent support for business development and risk control management, strengthen the security management of data, strengthen system protection work and reduce the risk of information leakage.

This paper enriches the measures taken by commercial banks to improve the risk control model of small and micro credit from the perspective of Big data credit reporting, forms a model based on dynamic Big data credit reporting, accurately monitors the loan risk of small and micro enterprises, and effectively strengthens the level of risk control.

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