Risk management of commercial banks in the context of digital transformation

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Abstract

The core of finance is risk control. The traditional risk management of commercial banks mainly relies on human experience and judgment. Facing the complex financial market environment, relying on a single artificial experience and judgment can no longer meet the needs of modern commercial bank business development. Commercial banks have continued to explore the path of digital transformation, and their understanding of digital risk management in practice has also continued to deepen. In the future, digital risk control is not only the comprehensive application of financial technologies such as data and models, but also an innovative model for the deep integration of commercial banking business and management. Commercial banks conduct cross-validation and comprehensive research and judgment on the information provided by customers by mining multi-dimensional data such as customer personal information data, product transaction data, credit data, credit investigation data, and third-party and partner relationship data, thereby optimizing commercial bank risk. In the context of digital transformation of commercial banks, digital risk control brings both challenges and opportunities to commercial banks. The challenges mainly lie in the determination of digital risk control and talent issues among commercial banks. The opportunity of digital risk control is to build a risk panorama view for commercial banks and quickly identify risk information that is not revealed in various business scenarios. Based on the background of digital transformation of commercial banks, this article discusses the risk management problems and countermeasures of commercial banks.

Introduction

In 2021, in the face of complex new situations and new challenges, the spirit of a series of conferences such as the Central Economic Work Conference and the Tenth Meeting of the Central Finance and Economics Committee fully revealed the necessity, importance and urgency of strengthening risk management at present. Commercial banks should actively Mining the value of data, rationally using relevant data, improving the effectiveness of commercial bank risk management, building a new ecosystem of commercial bank risk management, maintaining the stability of the financial market, and making due contributions to better serve the real economy. Since the beginning of the new century, due to the rapid development of Internet companies and financial technology companies, the walls of information technology have been continuously cleared, and big data technology is gradually changing the traditional risk control technology of commercial banks [田雨, 2022].

In the context of the new era, the advantages of the digital economy continue to be highlighted, and it has become an important engine to promote the upgrading and transformation of traditional industries [刘志洋, 解瑶姝, 2022]. General Secretary Xi Jinping pointed out that "it is necessary to promote the deep integration of the Internet, big data, and artificial intelligence with the real economy, so as to make the digital economy bigger and stronger." In recent years, the rapid development of new technologies such as big data, blockchain, cloud computing, and artificial intelligence has promoted the continuous growth of digital industrialization and industrial digitization, and also promoted the digital transformation of commercial banks. Finance is the blood of the economy, and the digital transformation of banks is an inevitable requirement to support economic transformation and upgrading and help improve national governance capabilities.

Belarus also attaches great importance to the development of the digital economy. In June 2020, the Central Bank of Belarus launched a digital currency pilot project, allowing 12 state-owned and commercial banks to trial digital currency and conduct business in the country's high-tech park.

In the process of digital transformation and development, relying on traditional risk management methods and technologies has become difficult to effectively respond to and satisfy the innovation and application of new products. Decision-making relies on experience, control relies on manual work, information asymmetry, and risk management is not intelligent, which has become a constraint to the transformation and development of commercial banks [Shen, 2022]. With the rapid development of commercial banks' full-process online business and the combination of online and offline businesses, it is urgent to build a new risk management system, improve the risk management capabilities supported by new technologies such as big data and cloud computing, and cultivate them as soon as possible. And the establishment of a professional risk management team that is independent, masters the core elements of risk management, and has the ability to apply financial technology can not only meet the current regulatory requirements, but also help commercial banks face various risks calmly, and promote the digital transformation of commercial banks A strong guarantee for strategy implementation and promotion of high-quality and rapid development.

Analysis of commercial bank operation status

The macro environment faced by the banking industry
In 2021, the global economy will begin to recover, but since the second half of the year, the

momentum has begun to weaken. The recovery process of various countries has gradually diverged, and risks have also emerged. The global economic growth in 2021 will be about 5.9% [IMF…, www], the fastest growth in 50 years. However, due to the spread of the Omicron mutant virus, tight supply chains, rising energy and commodity prices, etc., the growth momentum will weaken in the second half of the year. At the same time, macroeconomic risks such as inflation, debt, and asset bubbles have also accumulated. In this context, the monetary policies of major developed economies began to adjust. The Federal Reserve took the lead in withdrawing from quantitative easing, and planned to raise interest rates structurally, pushing the dollar and U.S. bonds higher, and guiding capital to return to China.

In 2021, China's banking regulatory policies will focus on corporate governance, risk prevention, asset-liability optimization, asset management transformation and other fields, and strive to promote a balance between stable growth and risk prevention, and guide high-quality development. The first is to issue a series of regulatory systems around corporate governance, reputation risk management, and systemic risk prevention to improve system construction. Including the issuance of regulatory measures for the behavior of major shareholders to strengthen the normative constraints on the behavior of major shareholders; the introduction of bank performance evaluation methods, regulatory rating methods, and reputation risk management methods, which have raised higher requirements for the development of banks from the perspective of medium and long-term development; Additional Supervisory Regulations on Important Banks (Trial) put forward higher requirements on the capital management model and risk measurement level of systemically important banks. The second is to optimize the asset structure of commercial banks through policy guidance and strengthening supervision. On the one hand, through market-oriented mechanisms and the creation of structural policy tools, guide financial institutions to increase support for key areas, weak links, and regional coordinated development, such as small and micro enterprises, private enterprises, "agriculture, rural areas and rural areas" and poverty alleviation; on the other hand, through means such as three red lines and concentration management, we will curb the illegal flow of operating loans into the real estate sector, and guide the transformation and development of the real estate industry. The third is to strengthen the management of debt quality and stabilize the cost of bank debt, including prohibiting local banks from opening deposits in other places, restraining banks from illegally soliciting deposits, introducing debt quality management measures, standardizing the rules for the upper limit of deposit interest rates, guiding the interest rate structure and maturity structure of commercial banks, and stabilizing debt cost, so as to support asset placement with a reasonable interest rate spread. The fourth is to standardize the development of off-balance sheet business and steadily promote the transformation of bank wealth management. By issuing new regulations on wealth management sales, new regulations on cash management products, and new regulations on wealth management liquidity risk management, we will continue to improve the regulatory system for wealth management subsidiaries, continue to promote the transformation of wealth management net value, and promote product pricing to return to marketization.

Status quo of banking industry

In 2021, the overall operation of banking financial institutions will be stable. Among them, the non-performing loan ratio will decrease and the quality of financial assets will improve. At the end of 2021, the balance of non-performing loans of commercial banks across the country was 2.8 trillion yuans, an increase of 145.55 billion yuans from the beginning of the year [曾刚…, www], and the increase was the lowest since 2014.

In order to further facilitate the disposal of financial non-performing assets, the regulatory authorities are actively exploring innovative pilot projects. In January 2021, the China Banking and

Insurance Regulatory Commission issued the "Notice on Carrying out the Pilot Work of Non-performing Loan Transfers", which approved the pilot program of single-account corporate non-performing loan transfers and batch transfers of personal non-performing loans. The trillion-dollar market has opened, and China's non-performing asset industry has taken a new key step in the market-oriented reform.

The pilot program of transfer of non-performing loans has received widespread attention from the market. On March 1, 2021, Industrial and Commercial Bank of China and Ping An Bank successfully carried out the first batch of single-account corporate non-performing loan and personal non-performing loan transfer pilot business in Yindeng Center through public bidding, and the pilot non-performing loan transfer officially broke the ice. At the beginning of the pilot program, due to the consideration of running-in business teams and brand effects, various resolution institutions had a strong demand for personal loan non-performing asset packages, and the demand was greater than the supply, resulting in a higher transaction unit price. However, with the gradual improvement of the market infrastructure, strong demand is transmitted to the supply side, the supply of non-performing asset packages for personal loans increases and the average supply scale increases, and the market price gradually returns to rationality.

From 2014 to 2021, the non-performing loan ratio of Chinese commercial banks will maintain an overall upward trend. It was 1.3% in 2014 and 1.73% in 2021 [2022…, www], a significant increase. However, compared with 2020, the non-performing loan ratio of Chinese commercial banks has declined.

Table 1 - Non-performing loan ratio of Chinese commercial banks from 2014 to 2021 [Ibidem]

Years	Non-performing loan ratio (%)
2014	1.3
2015	1.67
2016	1.74
2017	1.74
2018	1.83
2019	1.86
2020	1.84
2021	1.73

Difficulties in risk management of commercial banks in the context of digital transformation

The cost of data acquisition is high

There are many directions for the digital transformation of commercial banks, but the most important thing is digital risk control. Data is the foundation of digital risk control. Only by obtaining multi-dimensional and comprehensive data can we accurately assess and analyze various potential risks. However, data is obtained from different sources and calibers, and there is a large amount of unstructured data. Before digital risk control, commercial banks usually need to spend a lot of manpower and material resources on data cleaning and sorting. The above difficulties will lead to relatively high cost of data acquisition, and the data formats from different sources are different, and the data quality is uneven.

The development of new technologies is immature and relies too much on model systems

AI technology relies heavily on data models, but data models will bring various risks because of hidden defects in the knowledge structure and life experience of model builders. The immature development of new technologies has led to over-reliance on models and systems in digital risk control, and the risk identification ability of risk managers has declined. Once errors occur in the system, such as data errors, calculation errors, etc., risk managers cannot respond quickly and there will be a "black swan" event.

Risk of excessive collection or improper use of customer information and transaction data

Due to the characteristics of the business, while conducting business, there will be a large amount of customer-related data. If there is a problem with data management, the customer-related data will be exposed to danger. Commercial banks should assume the main responsibility for customer information protection, strengthen behavior constraints on cooperative institutions, ensure that the collection, processing, and use of consumers' personal information follow the principles of legality, legitimacy, and necessity, and ensure the safety and legality of information collection, processing, and use. Personal information shall not be provided to third parties without the client's consent or authorization, and the client's personal information shall not be used for purposes beyond the scope of authorization.

Lack of compound financial technology talents, difficult to meet the needs of digital risk control

The development of digital risk control requires compound comprehensive talents who understand both business and technology, and professional talents with both knowledge and wisdom. At present, there is a large shortage of digital risk control professionals in commercial banks. There are very few professionals who have big data analysis capabilities and can independently model, and there are very few compound fintech talents who understand financial technology. The model is to cross the river by feeling the stones, which is a pain point and difficulty in the implementation of digital risk control in commercial banks.

Digital risk management strategies of commercial banks

Promoting data standardization and labeling, and building a big data platform

Build a powerful data management platform, integrate internal portfolio data and external market data in a multi-dimensional, multi-level, and deep manner, collect various risk data of customers, clarify data specifications, unify data standards, and establish a risk data mart to serve the industry and the industry. It lays the foundation for the application of external data. By building a big data risk management platform, building a risk management core indicator system, forming a full-dimensional risk view of risk management, and analyzing customer information, business conditions, and customer relationship graphs, it meets the needs of professional and personalized risk management in various business fields. With these integrated and cleaned data, commercial banks can process and calculate multi-dimensional data, such as concentration, risk exposure, drawdown and other indicators, so as to achieve the purpose of risk monitoring.

Regardless of whether it is a traditional commercial bank or a modern commercial bank, the core of operation and management lies in risk management. With the development of big data, the use of face recognition and other technical means for risk control has produced a huge difference from traditional risk management concepts. With the support of big data, cloud computing, artificial intelligence, etc., it has gradually evolved into AI smart wind control decision mode. In terms of decision-making methods, digital risk control has changed from "causal decision-making" to "correlation decision-making". The traditional risk control of commercial banks mainly relies on

manual approval, which is a causal decision-making method. It judges its repayment ability and repayment willingness by analyzing historical credit records and income certificates. Under this decision-making method, commercial banks pay attention to user history. Modern commercial banks adopt a correlation decision-making method. Through the big data intelligent risk control system, correlation analysis is conducted to draw conclusions with relatively strong universality. This decision-making method focuses on relevant user behavior data. In terms of decision-making models, the thinking of digital risk control has changed from "expert experience" to "model decision-making", and machine learning models such as GBDT and random forest are used to make intelligent decisions.

Strengthening the specialization and intelligence of model construction

The ability to build risk control models is the core of digital risk control in commercial banks. Commercial banks should standardize and streamline the process of model development to realize the life cycle management of risk management models from project establishment to exit, and integrate risk management strategies. Relevant requirements such as preferences are flexibly configured into the risk control model to strengthen the rigid constraints of the risk control model. Commercial banks should establish a digital risk management model system to meet the requirements of external supervision and internal management. The digital risk control model system can be based on the risk management model control center, risk management strategy center, and risk management measurement center.

Modeling professionals need to conduct in-depth data mining based on complex business scenarios and massive data, build big data risk control models, including but not limited to anti-fraud, credit evaluation, risk prediction models, and continuously optimize and improve, evaluate the quality of data partners, according to Business requirements, tracking, monitoring, maintaining and optimizing risk strategies, proposing risk warnings, establishing sub-models based on risk control points, improving the risk control system, continuously introducing data dimensions, mining and extracting available features. Modelers also need to be familiar with commonly used algorithms, such as LR, DT, RF, gbdt, xgboost, and neural networks, have certain knowledge and experience in the understanding and application of machine learning algorithms, understand the principles behind modeling, and solve business problems through modeling problems, and have a rich understanding of the concept of risk management and control.

Using blockchain technology to empower digital risk control

The traditional risk control model can actually be understood from two perspectives. One is to carry out risk control work through formalized and institutionalized methods, and the other is to study and analyze human nature for risk management. Due to the existence of adverse selection and moral hazard, risks are fundamentally uncontrollable, and rigid mortgages cannot resolve systemic risks. Therefore, the premise of the application of blockchain technology is that systemic risks are not considered for the time being.

Blockchain is a term in the field of information technology. Essentially, blockchain is a shared database in which the data or information stored has the characteristics of "unforgeable", "retaining traces", "traceable" and "open and transparent". The application of blockchain in digital risk control is as follows. First, at the level of data circulation, the blockchain can provide a traceability path for financial data, which can effectively solve the problem of data confirmation and ensure the compliance of financial data circulation. When data is transferred between different entities, the whole process is completely shared. The detailed list of transactions and the query and traceability of each record are very clear. It has a very high impact on the confirmation of rights and compliance issues in high-speed data transfer. Second, at the level of data quality, the blockchain formulates data standards and

improves data quality through consensus verification, increasing the credibility of the data. The immutable nature of blockchain data can improve data quality. Under normal circumstances, risk control information comes from some transaction information, but there are some market problems at the transaction level, such as fraudulent data that makes a lot of data "noisy" very high, and through blockchain technology and architecture, the data acquisition level can be achieved at a certain level. Eliminate "noise" to a certain extent, the degree of data standardization is relatively high, and at the same time, the source of each data can be understood, and the data can be mutually verified on each node. Third, in terms of data security, various encryption technologies are used to ensure the security and privacy of data in use. The main features of the blockchain are distributed, consensus, and encryption, of which 1/3 is encryption technology. Data encryption technology is better reflected in the blockchain. The limitation of the wired upload mechanism makes it possible to use part of the data information without accessing the original data, ensuring the security of the entire system and the convenience of auditing. At the same time, through the smart contract of the blockchain, specific terms for the use of data can be given, and the use of data can be supervised accordingly.

The basic principles of risk control can be realized in the traditional digitization of risk control, and at the same time, it can also be realized on the latest blockchain. The special advantages of blockchain technology are convenient information sharing, saving time and reducing costs. From the perspective of industry practice, a large number of commercial applications are gathered on the blockchain, and the versatility of the underlying layer can enable the lender (investor) of funds to see the real data under the condition of being authorized, and the income of assets can be changed. Measure precisely. All of these will provide great room for imagination and application for future digital risk control.

Accelerating the R&D and application of financial technology and cultivating talents

Digital risk control relies on big data, cloud computing, etc. to establish a risk control model. The key to automatic upgrades and iterations of machine learning and risk management models is to have a professional risk management team that understands financial technology and has rich experience. Commercial banks should establish a digital risk control team A set of human resources management system is matched in terms of recruitment, training, use, management, and assessment. At present, the business model of commercial banks is changing rapidly, and the risk scenarios are changing a lot. It is easy for the phenomenon of "old revolution meets new problems". Many risk managers may not understand the relevant business model or product structure when conducting risk assessment or approval. For example, cyber risk has been ranked among the top three in the high-risk list of major risk management surveys in recent years, but there are only a handful of risk managers who can truly understand cyber risk in essence. Therefore, commercial banks need to encourage risk managers to develop the habit of lifelong learning and continuously strengthen their knowledge reserves. Personnel in the risk management line should vigorously implement the digital transformation strategy and create an agile and proactive big data risk control system. The efficiency and accuracy of risk control will be further improved, the cost of risk control will be further reduced, and the asset quality of commercial banks will be effectively improved. Realize the transformation of risk management from "human defense" to "technical defense" and then to "smart defense".

Digital risk control professionals need to have at least six abilities. The first is coding ability, which is the foundation of digital risk control and requires mastering SQL, R, Python, SAS and other skills. The second is the mathematical foundation, mainly the main content of probability theory and mathematical statistics, including mean value, variance, hypothesis testing, regression analysis, etc. In addition, it is necessary to master relevant decision tree algorithms, discrete mathematics, operations research, optimization, etc. content. The third is the mathematical modeling ability, which converts

business problems into mathematical problems for solving and analysis. The fourth is financial professional knowledge, such as "Money and Banking", "Macroeconomics", "Microeconomics" and other financial economic knowledge, including banking, credit industry-related regulatory agencies, functions and laws and regulations, etc. The fifth is data knowledge. Data is the raw material of digital risk control. Without these raw materials, nothing can be discussed. Digital risk control professionals need to understand the main methods of data acquisition, current mainstream prices, and the advantages involved in the use of each type of data. The sixth is industry and business experience, which includes commonly used risk strategies in different scenarios, commonly used coping methods when emergencies occur, decision-making mechanisms for risk strategies, how to communicate risk control requirements with IT departments, and how to write various documents.

Conclusion

In recent years, commercial banks have continued to explore the path of digital transformation, and their understanding of digital risk management in practice has also continued to deepen. In the future, digital risk control is not only the comprehensive application of financial technologies such as data and models, but also an innovative model for the deep integration of commercial banking business and management. Commercial banks conduct cross-validation and comprehensive research and judgment on the information provided by customers by mining multi-dimensional data such as customer personal information data, product transaction data, credit data, credit investigation data, and third-party and partner relationship data, thereby optimizing commercial bank risk.

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Управление рисками коммерческих банков в условиях цифровой трансформации

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Аннотация

Основой финансов является контроль рисков. Традиционное управление рисками коммерческих банков в основном опирается на человеческий опыт и суждения. В условиях сложной ситуацией на финансовом рынке нельзя полагаться на искусственный опыт и суждения, так как это не соответствует потребностям развития бизнеса современного коммерческого банка. В контексте цифровой трансформации коммерческих банков цифровой контроль рисков создает для них как проблемы, так и возможности. Проблемы в основном связаны с определением методов контроля цифровых рисков и поиском кадров. Возможность цифрового контроля рисков заключается в создании панорамы рисков для коммерческих банков и быстром выявлении информации о рисках, которая не раскрывается в различных бизнес-сценариях. Авторы рассматривают проблемы управления рисками и контрмеры коммерческих банков в контексте их цифровой трансформации.

Ключевые слова

Коммерческий банк, цифровая трансформация, риски, управление, управление рисками.

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