

# Analysis of the Role of Big Data in Shaping Banks' Risk Appetite and Risk-Taking Behavior

Xiesi Luo

Zhongnan University of Economics & Law, Wuhan, China

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**Abstract:** Against the background of the deep integration of digital economy and financial technology, big data technology is reconstructing the risk management paradigm of commercial banks from the bottom level, exerting systematic and sustained impacts on the formulation, transmission, implementation of banks' risk appetite and the choice of risk-taking behavior. Traditional banks' risk appetite and risk-taking behavior rely heavily on empirical judgment, sampling data and static indicators, which are generally plagued by problems such as information asymmetry, delayed risk identification, poor transmission of risk limits, excessive risk-taking or excessive risk aversion. Relying on the capabilities of multi-dimensional data collection, real-time processing, intelligent modeling and dynamic early warning, big data can effectively alleviate information asymmetry, improve the accuracy of risk measurement, optimize the allocation of risk limits, perfect the risk pricing mechanism, promote the transformation of banks' risk appetite from experience-driven to data-driven, and risk-taking from passive response to active management. Based on risk management theory, information asymmetry theory and behavioral finance theory, this paper systematically combs the theoretical logic and transmission path of big data's influence on banks' risk appetite and risk-taking behavior, analyzes the specific mechanism of big data from the dimensions of risk appetite system construction, credit decision-making, asset allocation, risk early warning, internal control and compliance, reveals the application effectiveness and practical constraints combined with the practice of domestic commercial banks, and puts forward countermeasures and suggestions such as improving data governance, optimizing model algorithms, strengthening compliance risk control, and improving governance mechanism. Studies show that big data can significantly enhance the scientificity, consistency and enforceability of banks' risk appetite, reasonably guide risk-taking behavior, and enhance the robustness of the banking system while improving operational efficiency and the ability to serve the real economy. The conclusions of this paper can provide theoretical reference and practical guidance for the digital transformation of commercial banks, the upgrading of risk management and the improvement of regulatory rules by regulatory authorities.

**Keywords:** Big data, Commercial banks, Risk appetite, Risk-taking, Risk management.

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## 1. Introduction

Finance is the core of the modern economy. As the core carriers of the financial system, commercial banks' risk appetite and risk-taking behavior are directly related to the efficiency of financial resource allocation, the accessibility of real economy financing and the stability of the financial system. Risk appetite refers to the systematic statement of the types, scales and boundaries of risks that banks are willing and able to bear, based on their capital strength, business strategies, market environment and regulatory constraints [1] It is the core hub connecting banks' strategic objectives and risk management practices, determining key business decisions such as credit placement, asset portfolio, business innovation and pricing strategies. Risk-taking behavior is the actual business selection and risk exposure arrangement formed by banks after weighing risks and returns under the established risk appetite, which is the concrete embodiment of risk appetite. Under the traditional risk management model, the formulation of risk appetite mostly relies on management experience and historical data review; risk measurement is dominated by sampling statistics; risk monitoring is relatively lagging; and risk transmission suffers from hierarchical attenuation. These problems easily lead to the disconnection between risk appetite and actual risk-taking behavior, excessive risk-taking or excessive risk aversion, which not only restrict operational efficiency but also accumulate potential risks.

With the rapid popularization of digital technologies such

as big data, cloud computing and artificial intelligence, the financial format and risk control logic have undergone profound changes [2] Big data breaks the boundaries of traditional data, integrates internal and external structured and unstructured data, and achieves full coverage of customer, business, market and regulatory information, providing a technical foundation for banks to accurately depict risks, dynamically adjust appetite and standardize risk-taking behavior. Compared with the traditional model, big data enables the transformation of risk identification from ex-post to ex-ante, static to dynamic, and partial to comprehensive. It effectively reduces information asymmetry, improves the accuracy of risk pricing, optimizes the allocation of capital and risk limits, and guides banks to take appropriate risks under the premise of controllable risks, balancing profitability, liquidity and security. In recent years, domestic commercial banks have successively promoted digital transformation, embedding big data into the whole process of risk management, forming a number of mature applications in retail credit, micro and small finance, transaction banking, market risk control and other fields, significantly improving the efficiency of risk appetite transmission and the rationality of risk-taking [3]

Current academic research on banks' risk-taking behavior mostly focuses on traditional factors such as monetary policy, regulatory constraints, corporate governance and macroeconomics [4] Research on the impact of financial technology such as big data mostly concentrates on single dimensions such as credit risk and credit efficiency. There is

a relative lack of literature that systematically explores the deep-seated mechanism of big data in shaping the whole process of risk appetite and risk-taking behavior. Based on this, this paper takes big data empowerment as the entry point, constructs an analytical framework of "technology empowerment—mechanism transmission—behavior optimization—stability improvement", and systematically explains the theoretical mechanism, practical path, practical challenges and optimization strategies of big data's influence on banks' risk appetite and risk-taking behavior, filling the gap in existing research and providing theoretical support and practical solutions for the digital risk control transformation of commercial banks.

## 2. Related Theories and Literature Review

### (1) Definition of Core Concepts

Risk appetite is the overall risk orientation determined by banks at the strategic level, which is a systematic expression of the types, levels, structures and boundaries of risks willing to be taken. It is usually transformed into quantifiable indicators such as non-performing loan ratio, provision coverage ratio, capital adequacy ratio, risk limits and risk-adjusted returns, running through all levels of the board of directors, management, business lines and branches. Risk tolerance is the phased acceptable fluctuation range of risk appetite, and risk-bearing capacity is the objective upper limit determined by hard constraints such as capital, liquidity and risk control capacity. The three together constitute the target system of bank risk management. Risk-taking behavior is the actual risk exposure formed by banks through credit approval, investment decision-making, product innovation and pricing strategies under the risk appetite framework, reflecting the real trade-off between risks and returns, which is jointly affected by internal governance, incentive mechanisms, technical capabilities and the external environment [5]

Big data refers to a collection of data that cannot be captured, managed and processed by conventional software tools within a certain period of time. It is characterized by massive scale, diverse types, high-speed circulation, low value density but high potential value. In banking applications, big data is not only a technical tool but also a core production factor driving the reform of risk control models, upgrading of decision-making models and innovation of business models. Through data integration, algorithm modeling, real-time computing and intelligent application, it realizes the precision, dynamics and intelligence of risk control.

### (2) Basic Theories

Information asymmetry theory is the core theory explaining bank risk decision-making. In traditional credit and investment businesses, there is significant information asymmetry between banks and customers. Banks cannot fully grasp the real operation, cash flow and implicit liabilities of customers, which easily leads to adverse selection and moral hazard [6] This forces banks to raise thresholds, tighten credit or over-mortgage, resulting in excessive risk aversion; or relax review due to insufficient information, leading to excessive risk-taking. Big data restores the real risk status of customers through multi-dimensional data cross-validation, reduces information barriers and improves decision-making accuracy.

Risk management theory emphasizes the whole-process closed loop of risk identification, measurement, monitoring

and control. Traditional risk control is dominated by historical data, static models and manual review, with lag, one-sidedness and subjectivity. Big data drives real-time data access, dynamic model iteration and whole-process monitoring and early warning, promoting the transformation of risk management from ex-post remedy to ex-ante prevention and passive response to active control, and improving the consistency of risk appetite implementation.

Behavioral finance theory points out that bank management and decision-makers have cognitive biases such as overconfidence, loss aversion and herding effect, leading to distorted risk appetite and irrational risk-taking. Big data replaces empirical judgment with objective data and algorithm models, reducing human intervention and cognitive bias, and improving the objectivity and stability of decision-making.

### (3) Literature Review

Foreign scholars have paid early attention to the impact of financial technology on bank risks, with research focusing on the role of big data credit investigation and algorithmic risk control in credit risk and financing efficiency. Some studies show that big data technology can improve information processing capacity, alleviate financing constraints of small and medium-sized enterprises, and reduce non-performing loan ratios of banks; other studies point out that excessive reliance on models may trigger model risk, and data privacy and compliance issues may amplify operational risk.

Domestic research mostly focuses on the impact of financial technology and digital transformation on bank risk-taking. Most empirical studies show that digital transformation inhibits excessive risk-taking of banks and enhances operational stability by improving risk control capacity and reducing information asymmetry; some studies find that digitalization may raise banks' risk appetite and promote banks to expand high-yield and moderate-risk businesses, especially benefiting inclusive finance fields such as micro and small enterprises and retail. Existing research rarely systematically analyzes the deep-seated mechanism of big data in the whole process of risk appetite formulation, transmission, implementation, adjustment and risk-taking behavior from the perspective of the whole process of risk appetite, and insufficiently discusses practical issues such as data governance, model compliance and governance coordination. This paper carries out research with this as a breakthrough point.

## 3. Theoretical Logic and Transmission Paths of Big Data in Shaping Banks' Risk Appetite and Risk-Taking Behavior

### (1) Theoretical Logic

The shaping of banks' risk appetite and risk-taking behavior by big data follows the inherent logic of "data empowerment—capacity improvement—mechanism optimization—behavior standardization". Big data breaks internal and external data barriers and builds a global data system covering customers, businesses, markets, internal control and supervision, providing comprehensive, real-time and accurate decision-making basis for risk appetite formulation; relying on distributed computing and intelligent algorithms, it improves the capacity of risk identification, measurement, pricing and early warning, transforming risk appetite from qualitative and empirical to quantitative and

scientific; through system embedding and process reengineering, it realizes the automatic transmission of risk limits, pricing rules and approval standards, solving hierarchical attenuation and implementation deviations, and ensuring high consistency between risk-taking behavior and risk appetite; relying on dynamic monitoring and real-time adjustment, it adapts to changes in market and customer risks, maintains the flexibility and resilience of risk appetite, and avoids excessive risk-taking or risk aversion.

The role of big data in risk appetite is reflected in three improvements: scientificity, consistency and dynamics. Scientificity is reflected in supporting appetite formulation with multi-dimensional data and quantitative models to reduce subjective bias; consistency is reflected in realizing unified appetite, standards and implementation across the bank through system rigid constraints; dynamics is reflected in real-time monitoring of risk indicators, rapid adjustment of appetite and limits to improve adaptability.

The role of big data in risk-taking behavior is reflected in two-way optimization: on the one hand, it inhibits irrational excessive risk-taking by accurately identifying high-risk customers and businesses, strengthening early warning and disposal, and reducing non-performing assets and losses; on the other hand, it alleviates ineffective risk aversion by accurately assessing the risks of small and micro enterprises and inclusive customer groups, expanding reasonable credit placement and improving resource allocation efficiency.

#### (2) Transmission Paths

Big data acts on risk appetite and risk-taking behavior through four core paths.

The first is the data support path. Big data integrates internal account, transaction, credit investigation and mortgage data with external industrial and commercial, tax, judicial, electricity, consumption, logistics, public opinion and other data, builds a 360-degree customer risk portrait, comprehensively evaluates the first source of repayment, the second source of repayment and implicit risks, provides an objective basis for risk appetite formulation, and avoids decision-making distortion caused by insufficient information.

The second is the technical empowerment path. Relying on machine learning, deep learning, knowledge graph and other algorithms, it constructs models for credit evaluation, market risk measurement, operational risk monitoring and fraud identification, realizing refined risk measurement, differentiated pricing and pre-warning, improving the capacity of risk appetite implementation and guiding risk-taking behavior back to rationality.

The third is the mechanism transmission path. Big data promotes the embedding of risk appetite into core business systems, realizing automation and rigidity of credit approval, quota management, post-investment monitoring and limit control, eliminating unauthorized breaches of risk bottom lines by branches and business lines, and ensuring that risk-taking is consistent with the head office's appetite.

The fourth is the governance optimization path. Big data provides the board of directors and management with a real-time risk view, strengthens the supervision of risk appetite implementation and performance appraisal linkage, improves incentive and restraint mechanisms, inhibits short-term profit-seeking behavior, and promotes long-term and stable risk-taking behavior.

In summary, big data achieves quantifiable, transmittable, implementable and adjustable risk appetite through the coordination of data, technology, mechanism and governance,

driving risk-taking behavior towards rationalization, moderation and efficiency, and ultimately achieving the goals of controllable risks, stable returns and improved service quality.

## 4. Application Scenarios and Mechanisms of Big Data in Banks' Risk Appetite and Risk-Taking Management

### (1) Big Data-Driven Scientific Construction of Risk Appetite System

The traditional formulation of risk appetite relies on historical data and empirical judgment, with single indicators, insufficient flexibility and weak forward-looking. Based on massive historical, macro, industry and peer data, big data constructs a multi-dimensional and multi-level risk appetite indicator system covering all types of risks such as credit risk, market risk, liquidity risk, operational risk, country risk and reputation risk, realizing the combination of qualitative and quantitative, total and structure, short-term and long-term.

In terms of indicator setting, big data can fit the fluctuation laws of risk indicators under different economic cycles and industry cycles, calculate the optimal risk appetite interval combined with constraints such as capital adequacy ratio, leverage ratio and profitability, and determine the core indicator thresholds such as non-performing loan ratio, overdue ratio, risk-weighted asset growth rate, industry concentration and customer concentration. In terms of structural optimization, big data analyzes the risk-return characteristics of industry, region, customer and product dimensions, sets differentiated limits, guides credit resources to allocate to low-risk, high-yield fields in line with national strategies, restricts the placement of high-risk and overcapacity industries, and improves the stability of asset portfolios. In terms of dynamic adjustment, big data monitors external shocks such as macroeconomic, policy changes, market fluctuations and public opinion risks in real time, combined with changes in internal asset quality and capital adequacy ratio, automatically triggers risk appetite adjustment suggestions, which are quickly implemented after approval to maintain strategic adaptability.

### (2) Big Data Optimizes Credit Decision-Making and Credit Risk-Taking Behavior

Credit business is the core business of banks and the main carrier of risk-taking, and information asymmetry is the main source of credit risk. Big data reshapes the risk identification and pricing mechanism in the whole credit process and guides the rational undertaking of credit risk.

In the pre-loan access link, banks integrate multi-dimensional data to build intelligent risk control models, realize automatic customer risk scoring and classification, and accurately judge default probability and loss given default. For small and micro enterprises and inclusive customers, big data breaks the traditional reliance on collateral, assesses credit based on operation, tax payment, water and electricity, transactions and other information, improves financing accessibility, and avoids blind lending. In the mid-loan approval and pricing link, big data realizes automatic and standardized approval, shortens the cycle and reduces human intervention; implements differentiated pricing based on risk level, makes interest rates cover risk costs, improves risk-adjusted returns, and solves the problem of inappropriate risk-taking caused by pricing distortion. In the post-loan

management link, big data builds a dynamic monitoring system, tracks customers' operation, finance, public opinion, justice and other information in real time, identifies risk signals and issues early warnings in a timely manner, and takes measures in advance to reduce losses.

### (3) Big Data Improves Market Risk and Liquidity Risk Management

Market risk and liquidity risk are greatly affected by macro and market factors, and the traditional model has lagging monitoring and slow response. Big data strengthens real-time monitoring, stress testing and emergency management, stabilizes risk appetite and standardizes risk-taking.

In terms of market risk management, big data collects real-time data such as interest rates, exchange rates, stock prices and commodity prices, combines position and transaction data, quickly calculates indicators such as value at risk and expected loss, identifies abnormal fluctuations, and automatically implements stop-loss and limit control to avoid excessive market risk-taking. In terms of liquidity risk management, big data integrates full-scale capital transactions, deposits, loans, interbank, wealth management and other data, monitors key indicators in real time, builds a multi-dimensional stress testing model, simulates extreme scenarios, improves emergency response capacity, and stabilizes liquidity risk appetite.

### (4) Big Data Strengthens Operational Risk and Internal Control Compliance Management

Operational risk originates from internal processes, personnel, systems and external events, with strong concealment and unpredictability. Big data realizes real-time monitoring, intelligent identification and active prevention and control of operational risks, reduces operational risk exposure and stabilizes risk appetite.

Big data monitors employees' operations, authorization, abnormal transactions and other behaviors to identify violations and fraud risks; monitors system operation, data quality, network security and other conditions to prevent technical risks; embeds compliance rules, monitors business compliance, and automatically warns violations to avoid unexpected losses caused by operational and compliance risks.

### (5) Big Data Improves Risk Pricing and Capital Allocation Mechanisms

Risk pricing and capital allocation are the core links connecting risk appetite and risk-taking. Big data improves pricing accuracy and capital allocation efficiency, and guides rational risk-taking.

Based on multi-dimensional data such as customers, debt items, industries and regions, banks build refined pricing models to realize one price for one customer and one price for one transaction, matching returns with risks. Relying on big data to accurately measure risk-weighted assets and economic capital of each business, product and line, linking capital occupation with risk appetite, guiding businesses to transform to capital-saving and high-yield types, improving capital use efficiency, and inhibiting risk-taking behavior with high capital consumption.

## 5. Practical Effects, Existing Problems and Constraints of Big Data Application

### (1) Practical Effects

In recent years, with the accelerated advancement of digital transformation, Chinese commercial banks have gradually

embedded big data technology into the whole process of risk appetite management and risk-taking decision-making, and achieved remarkable practical results. First, the scientificity and forward-looking nature of risk appetite setting have been significantly improved. With the support of multi-dimensional data, banks can accurately measure risk boundaries and tolerance intervals under different macroeconomic cycles and industry environments, making the risk preference system more matched with strategic positioning and capital strength. Second, the efficiency and consistency of risk appetite transmission have been greatly enhanced. By embedding risk indicators and quota constraints into business systems, the phenomenon of hierarchical attenuation and local deviation in the traditional model has been effectively curbed, and the uniformity of risk appetite across the bank has been realized. Third, the rationality of risk-taking behavior has been significantly optimized. Big data has alleviated information asymmetry, enabling banks to accurately identify customer risks, implement refined pricing and quota management, reduce excessive risk aversion in inclusive finance and small business loans, and restrain blind risk-taking in high-risk businesses. Fourth, the level of full-cycle risk management has been upgraded. Real-time data monitoring and intelligent early warning capabilities enable risk management to shift from post-event disposal to pre-prevention and in-process control, which effectively reduces the probability of unexpected risks and non-performing assets. Fifth, the efficiency of capital allocation and risk-adjusted return has been improved. Driven by big data, economic capital measurement is more accurate, and resources are tilted toward low-capital consumption and high-quality assets, which enhances the overall stability and profitability of commercial banks while serving the real economy.

### (2) Existing Problems

Although the application of big data has achieved remarkable results, there are still many practical problems in the process of empowering risk appetite and risk-taking management. First, the data foundation and governance system are not perfect. Internal data caliber is inconsistent, information islands are prominent, and data completeness, timeliness and accuracy are insufficient. The integration of external data is limited by sources and channels, and problems such as missing information, distortion and lag are common, which seriously affect the stability of model operation and the reliability of decision-making. Second, model risks and technical risks are increasingly prominent. Many models rely on historical data fitting, with insufficient interpretability and poor stability across cycles. Problems such as algorithm bias, overfitting and failure under extreme scenarios are likely to lead to misjudgment of risk status. Excessive dependence on technology and algorithms may also weaken manual judgment and cause potential risks to be ignored. Third, the transmission and implementation of risk appetite are still blocked. In some banks, risk appetite indicators are not fully integrated with business processes, system embedding is not deep enough, and rigid constraints are not in place. The assessment and incentive mechanism are not closely linked with risk appetite, leading to the possibility of separation between actual risk-taking and strategic orientation. Fourth, the shortage of compound talents has become an obvious shortcoming. Professionals who are proficient in finance, risk management, data analysis and algorithm modeling are relatively scarce, and the overall data literacy of risk managers is insufficient, which restricts the depth and effect

of big data application. Fifth, compliance and security risks are increasingly prominent. In the process of data collection, application and circulation, it is difficult to fully balance development and compliance. Data privacy protection, information security and algorithm compliance face strict regulatory requirements, and operational risks and legal risks are increasing.

### (3) Constraints

The further application of big data is restricted by both external environment and internal management. From the external perspective, the social data sharing mechanism is not yet sound. Public data opening is insufficient, industry data barriers are obvious, and data channels between government departments, enterprises and financial institutions are not fully connected, making it difficult to form high-quality and continuous data supply. The regulatory system needs to be further improved. The standards and guidelines for data compliance, model governance, algorithm audit and risk disclosure are not unified, which increases the uncertainty of bank business promotion. From the internal perspective, some commercial banks have unclear strategic positioning, insufficient investment in digital risk control, and tend to focus on business scale growth rather than long-term risk management capacity building. The traditional organizational structure and management model are not fully adapted to the data-driven risk management model, departmental coordination is not smooth, and risk culture is insufficient. In addition, the incentive mechanism is not closely integrated with risk-adjusted returns, and the short-term performance orientation is relatively obvious, making it difficult to fully guarantee the long-term stability and rationality of risk-taking behavior.

## 6. Countermeasures and Suggestions for Optimizing Big Data Empowerment of Banks' Risk Appetite and Risk-Taking Management

### (1) Improve the Data Governance System and Consolidate the Data Foundation

Commercial banks should take data governance as a long-term strategic project, and establish a full-process data management system covering data collection, integration, quality control, application and security management. On the basis of unifying internal data calibers, banks should promote the integration of customer information, transaction records, account information and asset data, eliminate information islands between departments and business lines, and form a standardized and consistent data resource system. At the same time, banks should expand high-quality external data sources in compliance with laws and regulations, including government public data, enterprise operation information, industry and commerce, tax, judicial, logistics and other alternative data, and improve data coverage and timeliness through standardized access and cleaning mechanisms. In addition, it is necessary to strengthen data quality management, establish data verification, error correction, traceability and evaluation mechanisms, reduce missing, abnormal and inconsistent data, and provide stable and reliable data support for risk measurement, model operation and decision-making [7]

### (2) Strengthen Technology R&D and Model Management to Prevent Technical Risks

Banks should establish a full-life-cycle management mechanism for risk models to reduce model risks and over-reliance on algorithms. In the model development stage, attention should be paid to interpretability and stability, avoiding excessive pursuit of prediction accuracy and ignoring economic logic and business rationality. In the model verification and monitoring stage, regular back-testing, pressure testing and stability testing should be carried out to track changes in model performance under different economic cycles and market environments, and timely iteration and optimization should be conducted when deviation occurs. Meanwhile, banks should strengthen the construction of independent research and development capabilities of big data platforms, improve data processing efficiency and computing power support, and enhance the stability and security of technical architecture. In the process of intelligent application, human intervention and decision-making calibration should be retained to avoid completely automated decision-making, so as to ensure that risk-taking behavior is always within the controllable range of risk appetite.

### (3) Improve the Risk Appetite Transmission and Implementation Mechanism and Strengthen Rigid Constraints

To solve the problem of inconsistent risk appetite and inconsistent implementation, commercial banks should embed risk appetite indicators and risk limits into core business systems such as credit approval, quota management, asset investment and post-loan management, so as to realize automatic control and whole-process monitoring. Banks should clarify the hierarchical transmission path of risk appetite, decompose strategic objectives into branch and business line indicators, and form a quantifiable, assessable and accountable management system. At the same time, risk appetite execution should be incorporated into the performance appraisal system, and the assessment weight of risk indicators should be reasonably set to restrain short-term profit-seeking behavior. Through real-time monitoring and early warning of risk indicators, once the risk limit approaches or exceeds the threshold, early warning and disposal procedures will be activated automatically to ensure that risk-taking is always within the risk appetite framework.

### (4) Strengthen Talent Team Building and Cultivate a Data-Driven Risk Control Culture

The application of big data puts forward higher requirements for the comprehensive quality of risk management personnel. Commercial banks should strengthen the training of compound talents with financial expertise, risk management experience and data analysis capabilities, and build a professional team covering data scientists, model developers, risk analysts and business experts. On the one hand, internal training and external introduction should be combined to improve employees' ability in data application, model understanding and risk identification; on the other hand, data-driven, prudent and standardized risk culture should be cultivated to enhance employees' awareness of risk appetite compliance. Through concept promotion, system constraints and case guidance, banks can form a risk management atmosphere that attaches importance to data, follows rules and insists on long-termism, and provides talent support and cultural guarantee for standardized risk-taking behavior.

### (5) Strengthen Compliance Management and Collaborative Governance to Keep the Bottom Line of Risks

In the context of strong supervision, commercial banks

must integrate compliance requirements into the whole process of big data application. Banks should strictly abide by laws and regulations related to data security, personal information protection and algorithm ethics, standardize data collection, storage, use and circulation procedures, and strengthen data desensitization and authority management. In terms of internal control, perfect the risk management system of big data business, clarify the responsibilities of all posts, and strengthen the monitoring and restriction of key links. Banks should also establish a sound risk disposal mechanism to respond to emergencies such as data leakage, model failure and systemic abnormalities, so as to avoid the spread of risks. At the same time, strengthen communication and cooperation with regulatory authorities, keep abreast of regulatory trends, and ensure that big data applications are standardized, compliant and sustainable, so as to provide a solid institutional guarantee for the stable operation of risk appetite and risk-taking management.

## 7. Conclusion

Big data technology has profoundly changed the formation, transmission, implementation and dynamic adjustment mechanism of commercial banks' risk appetite, and effectively guided risk-taking behavior toward rationalization, moderation and sustainability. Based on risk management theory, information asymmetry theory and behavioral finance theory, this paper explores the theoretical logic, transmission paths and application scenarios of big data in shaping risk appetite and risk-taking behavior. The results show that big data can significantly enhance the scientificity, consistency and adaptability of risk appetite, reduce information asymmetry, improve the accuracy of risk measurement and pricing, optimize capital allocation and risk limit management, and restrain irrational risk-taking while easing excessive risk aversion. In practice, big data has been widely used in credit decision-making, risk monitoring, market risk management and internal control, which has improved the overall risk management efficiency and operational stability of commercial banks. However, in the process of digital empowerment, banks still face practical constraints such as imperfect data governance, prominent model risks, blocked risk transmission, shortage of compound talents and increasingly stringent compliance requirements. Therefore, banks should further strengthen data governance, improve model full-life-cycle management, unblock risk appetite transmission channels, strengthen talent training and shape a sound data-driven risk culture. In the future, with the continuous integration of big data, artificial intelligence and cloud computing, the risk management of commercial banks will move toward a more intelligent, agile and standardized stage. Risk appetite will achieve real-time dynamic optimization, and risk-taking behavior will be more matched with strategic goals and regulatory requirements. It is necessary for commercial banks to persist in promoting digital transformation, balance innovation and risk control, and continuously improve the quality and efficiency of risk management. Regulatory authorities should also improve relevant systems and standards to create a stable and standardized development environment, so as to promote the high-quality development of the banking industry and maintain the security and stability of the financial system.

## Acknowledgements

The author gratefully acknowledges the support and valuable suggestions provided during the research process. Thanks are also due to the reviewers for their constructive comments that helped improve this paper.

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