

Research on Business Models and Risk Governance Frameworks for Fintech-Enabled Financing of Micro and Small Enterprises

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Abstract: This study focuses on the core proposition of "financial technology empowering the financing of micro and small enterprises," systematically exploring its business model innovation and risk governance framework construction. The paper first analyzes the theoretical logic and practical motivations for financial technology to solve the financing difficulties of micro and small enterprises, pointing out that it effectively alleviates the two core obstacles of information asymmetry and excessively high transaction costs by reconstructing risk pricing models and service processes. The study further deconstructs the value creation mechanisms and operational characteristics of typical business models such as digital lending, supply chain finance, and big data risk control, finding that while these models improve the accessibility and efficiency of financial services, they also generate complex challenges such as technological risks, new business risks, compliance risks, and systemic risks. Based on an in-depth analysis of risk characteristics, this paper innovatively proposes a multi-layered, dynamic risk governance framework. This framework emphasizes the organic unity of internal governance, external supervision, and ecosystem collaboration: at the micro level, it requires fintech companies to establish a full-process risk control system and compliant technology applications; at the meso level, it advocates adaptive regulatory models such as regulatory sandboxes and penetrating supervision; and at the macro level, it requires improving infrastructure such as credit information sharing and multi-party co-governance mechanisms. The case study of MYbank validated the practical value of this governance framework. The study ultimately concluded that the sustainable development of fintech must be built upon the simultaneous improvement of business model innovation and risk governance capabilities, requiring the construction of a dynamic governance ecosystem that balances innovation incentives and risk control.

Keywords: Fintech; SME financing; Business model; Risk governance; Inclusive finance; Regulatory technology

1 INTRODUCTION

As the capillaries of the national economy, micro and small enterprises (MSEs) play an irreplaceable and crucial role in promoting growth, driving innovation, and absorbing

employment. However, the difficulty and high cost of financing have always been long-term pain points restricting their development. Traditional financial institutions, limited by service costs and risk control models, find it difficult to effectively cover these small-scale market entities that lack collateral and have opaque information, resulting in a significant credit rationing phenomenon [1]. At the same time, financial technologies represented by big data, artificial intelligence, and blockchain are profoundly reshaping the financial landscape, providing new possibilities for resolving this structural contradiction. Against this backdrop, the core questions of this study are: through which business models does financial technology empower MSE financing? What new risks arise from these innovative models in their operation? And how can a systemic risk governance framework be constructed to achieve a sustainable balance between incentivizing innovation and preventing risks?

A deep exploration of this issue has both important theoretical value and practical significance. At the theoretical level, this study examines and expands classic financial theories such as information asymmetry and transaction costs within the new context of fintech, helping to reveal how technological variables change the traditional logic of credit supply and risk generation mechanisms, and providing empirical support from the microfinance sector for the development of fintech theory [2]. At the practical level, the research results aim to provide guidance for fintech companies to optimize their business models and risk control systems, provide decision-making references for regulatory authorities to formulate more targeted and forward-looking policies and regulations, and ultimately help to unclog the financing bottlenecks of micro and small enterprises and promote the high-quality development and inclusive growth of the real economy.

Looking at the current state of research at home and abroad, the academic and industry communities have recognized the huge potential of fintech in the field of micro and small enterprise financing. Existing literature generally affirms its positive role in reducing transaction costs, improving service efficiency, and expanding coverage, and has made preliminary descriptions of specific models such as digital credit and supply chain finance. However, most studies either separate business models from risk governance or focus on isolated analysis of single risks (such as technological risk or credit risk), lacking a systematic analytical paradigm that organically connects business models, risk characteristics, and governance frameworks. Especially in terms of risk governance, existing research has insufficiently explored the structural changes in risks caused by fintech and their systemic impact. The proposed governance suggestions are often fragmented and fail to form a multi-layered, collaborative overall solution.

Based on this, this study follows the logical framework of "theoretical foundation-model deconstruction-risk identification-framework construction-case verification." In terms of methodology, it will comprehensively utilize literature analysis, comparative research, in-depth case analysis, and normative analysis to strive for a combination of theory and practice. Specifically, the technical approach is to first review the relevant theoretical foundations and real-world motivations, then systematically summarize and analyze the current mainstream business models, and subsequently deeply explore the hidden technological, business, compliance, and systemic risks behind various models. Based on this, an integrated risk governance framework covering three dimensions-internal governance, external supervision, and ecosystem collaboration-is proposed. Finally, the theoretical framework is verified and

revised through case studies of typical platforms [3]. The anticipated innovation of this study lies in its attempt to construct a complete logical chain connecting "business model innovation - new risk identification - systematic governance response," emphasizing the correlation between different risks and the synergy between governance levels, and proposing "regulatory technology" and "compliance technology" as key tools embedded in the governance process. Of course, studying also has certain limitations. Such as the fintech landscape is still rapidly evolving, and any static study can hardly fully capture its latest developments. Furthermore, the effectiveness of the proposed governance framework needs to be tested and refined in the future through more extensive empirical data and longer-term observation.

2 THE THEORETICAL BASIS AND PRACTICAL DRIVING FORCE OF FINTECH EMPOWERING FINANCING FOR MICRO AND SMALL ENTERPRISES

To delve into how fintech is reshaping the financing landscape for micro and small enterprises, we must first clarify the theoretical foundation and driving forces behind its core concepts. Fintech is not simply a combination of technologies, but an industrial form that uses cutting-edge technologies such as big data, artificial intelligence, blockchain, and cloud computing as core elements to disrupt and innovate traditional financial service models. These technologies together form the underlying pillars of the empowerment process: big data is the "fuel" for understanding the true operating conditions of enterprises, artificial intelligence is the "brain" for risk identification and decision-making, cloud computing provides a flexible and scalable computing power "platform," and blockchain aims to build a "bond" for trusted collaboration [4]. In contrast, micro and small enterprises are usually defined based on indicators such as the number of employees, operating income, and asset size. They play an important role in the national economy, but their financing needs exhibit the distinct characteristics of being "short-term, small-scale, frequent, and urgent," which creates a profound contradiction with the standardized and large-scale supply model of traditional financial services.

The essence of this contradiction can be explained by classic economic theories. First, the information asymmetry theory reveals the core of the problem: compared with large enterprises, micro and small enterprises lack audited financial statements and sufficient collateral, and their internal information is highly opaque. This leads to extremely high adverse selection and moral hazard for financial institutions, ultimately excluding most micro and small enterprises from their service scope through "credit rationing". Second, the transaction cost theory provides another perspective: the due diligence, approval and post-loan management costs paid by traditional financial institutions for a single micro and small loan are extremely disproportionate to the potential returns, and the high transaction costs stifle the commercial sustainability of their services [5]. The long tail theory, on the other hand, points out the potential of financial technology from the perspective of market structure: traditional financial institutions mainly serve high-net-worth clients and large enterprises, while the large number of micro and small enterprises with diverse needs constitute the "long tail" of the financial market. By using technology to reduce the marginal cost of services, it becomes possible to meet the tail needs in a large-scale and personalized manner, thereby opening a huge blue ocean of value.

The theoretical possibility is rooted in the harsh reality. The traditional financial system has many "pain points" that are difficult to heal itself when serving micro and small enterprises. In terms of customer acquisition, the reliance on offline branches and interpersonal relationships is inefficient and fails to reach the vast number of dispersed micro and small

enterprises. In terms of risk control, the dependence on central bank credit reports and the culture of collateral and guarantees is precisely the Achilles' heel of micro and small enterprises, rendering risk control models virtually ineffective. In terms of operations, the lengthy, paper-based approval process is completely incompatible with the urgent funding needs of micro and small enterprises. These structural deficiencies collectively contribute to the long-standing predicament of "difficult and expensive financing" for micro and small enterprises.

It is precisely the failure of the traditional model that provides a historic opportunity for fintech to break through these limitations. Its inherent logic lies in revolutionizing the financing process through technological paradigm shifts. In customer acquisition, utilizing online platforms and embedded scenarios significantly reduces reach costs. In terms of risk control, it shifts its focus from the traditional "three statements" (balance sheet, profit and loss statement, and cash flow statement) to the "three flows" (information flow, logistics, and capital flow) of enterprises. By mining the transaction, payment, and social behavior data left by enterprises and their owners in the digital ecosystem, it uses artificial intelligence algorithms to build a new credit assessment model, hardening "soft information" into quantifiable credit assets, thereby effectively penetrating the fog of information [6]. At the same time, the automated approval process greatly improves efficiency and reduces operating costs. This series of changes essentially transform immeasurable risks into manageable risks, and uneconomical transactions into sustainable businesses, ultimately opening the "last mile" of financial services for micro and small enterprises.

3 ANALYSIS OF TYPICAL BUSINESS MODELS FOR FINTECH-ENABLED FINANCING FOR MICRO AND SMALL ENTERPRISES

Driven by both theoretical motivations and practical needs, fintech has spawned a variety of innovative business models serving the financing needs of MSEs. These models are not simply applications of single technologies, but rather differentiated solutions formed by embedding technologies into business processes based on a deep understanding of the pain points in different financing scenarios.

Among these, the business model based on digital lending most directly embodies the core advantages of fintech. This model is typically represented by internet banks such as MYbank and WeBank, whose operations are entirely online, directly reaching MSE users through scenario interfaces or open platforms. The platform utilizes pre-set algorithmic models to perform real-time analysis and credit scoring of multi-dimensional data authorized by users (such as transaction records, online behavior, and logistics information), achieving approval and loan disbursement within seconds. The revolutionary aspect of this model lies in its transformation of the traditional "collateral-based" logic into "credit-based" and "data-based" principles. Its core competitive advantage lies in its extreme efficiency and scalability, enabling it to serve a massive number of customers at near-zero marginal cost. This creates new value in inclusive finance, allowing individual business owners and micro-enterprises who previously struggled to obtain start-up or working capital to gain equal financial opportunities.

Compared to the universality of digital lending, the supply chain finance-based business model focuses on the industrial ecosystem, demonstrating greater precision and penetration. This model revolves around the transaction network of core enterprises, utilizing the immutable and traceable characteristics of blockchain technology to digitize the complex contracts, orders, accounts receivable and payable among enterprises on the chain into divisible and transferable debt certificates. Simultaneously, IoT technology monitors the status, location, and movement of pledged goods in real time, effectively solving the problem of movable property pledge supervision [7]. The core advantage of this model lies in its successful and reliable transmission and penetration of the strong credit of core enterprises along the transaction chain, enabling small and micro suppliers at the end of the industrial chain to

quickly obtain financing based on their genuine accounts receivable from the core enterprises. This not only revitalizes the dormant assets of small and micro enterprises but also enhances the collaborative resilience and operational efficiency of the entire industrial chain.

Furthermore, the market has fostered other specialized business models. Such as platforms based on digital bills and accounts receivable financing focus on digitizing traditional financial instruments such as commercial drafts, accelerating the flow of funds and reducing operational and fraud risks through online matching and verification. Meanwhile, pure big data credit scoring and risk control service platforms choose to play the role of "enabler" rather than "funder," providing standardized credit scores and risk decision-making advice to traditional banks and other licensed financial institutions, helping them improve their risk control capabilities in serving small and micro enterprises. In this process, a technology and data-driven B2B service market has been formed.

A comprehensive examination of these typical models reveals that they constitute a multi-layered and complementary financial service ecosystem. Digital lending models cover the broadest "long tail" customer base, supply chain finance models are deeply rooted in specific industry scenarios, while professional asset financing and risk control service platforms provide crucial infrastructure capabilities. Each model, in its unique way, restructures the logic of value creation and risk pricing. Together, they are driving the evolution of SME financing services from a standardized, singular traditional paradigm to a new paradigm that is scenario-based, precise, and ecosystem-based. This transformation not only improves the efficiency of financial resource allocation but also profoundly reshapes the connection between SMEs and the financial system.

4 RISK IDENTIFICATION AND CAUSAL ANALYSIS OF FINTECH-ENABLED FINANCING FOR MICRO AND SMALL ENTERPRISES

While fintech is reshaping the financing ecosystem for micro and small enterprises, it has also given rise to a series of new risks. These risks are intertwined with traditional financial risks, forming a more complex risk profile. The double-edged sword effect of technological empowerment is evident here, with its inherent technological vulnerability becoming the primary source of risk. The collection, transmission, and storage of massive amounts of data pose unprecedented challenges to data security and user privacy. Once leaked, its impact and destructive power will far exceed those of traditional models. At a deeper level, the core driving force of business intelligence-the algorithm model itself-has inherent risks. The training data of the model may contain historical biases, leading to algorithmic discrimination against specific groups. The "black box" nature of the model makes its decision-making logic difficult to explain and audit. Coupled with the potential failure of the model in unknown market environments, this constitutes a hidden and serious model risk [8]. In addition, the business architecture, which is highly dependent on the Internet and cloud services, naturally exposes it to the threat of cyberattacks. Systemic technical failures or service interruptions may instantly paralyze the entire financing process, causing business shutdowns.

At the business level, the form of risk has also undergone significant evolution. Credit risk has not disappeared but has manifested in new forms. Given the persistent information silos in the context of multiple lending, the probability of a single micro-enterprise over-borrowing by exploiting information asymmetry between different platforms, leading to "shared debt risk," is significantly increased, with greater concealment and suddenness. The connotation of operational risk also changes accordingly. Although automated processes reduce human error, errors in program settings and interaction failures with third-party API interfaces can lead to systemic operational errors with greater efficiency and wider scope [9]. Simultaneously, some digital lending platforms rapidly recover funds through asset securitization, and the stability of their funding sources and the maturity matching between assets and liabilities will face

severe challenges when market liquidity tightens or investor confidence fluctuates, increasing the difficulty of managing liquidity risk.

The pace of innovation in financial technology often outpaces the establishment of regulatory rules, resulting in significant compliance and legal risks. The cross-border and novel nature of business models often lead them to operate on the fringes of the existing regulatory system, creating a certain regulatory arbitrage space. However, this is accompanied by increased policy uncertainty, and sudden changes in regulatory policies may have a disruptive impact on existing business models [10]. In the pursuit of efficiency, principles of consumer protection such as full disclosure, fair transactions, and data privacy may be overlooked, sparking new social controversies. Furthermore, the online and contactless nature of business operations increases the difficulty of customer identification and transaction background verification, providing potential channels for money laundering and terrorist financing activities, and posing a serious challenge to traditional anti-money laundering risk control systems.

When these risks accumulate and interconnect within fintech networks, they may breed systemic risks with macroeconomic spillover effects. Fintech platforms, through fund transfers and information linkages, tightly connect numerous small and micro enterprises, financial institutions, and investors. While this interconnectivity improves efficiency in normal times, it can become a channel for the rapid spread and amplification of risks during crises; the failure of one node can trigger a chain reaction. More importantly, algorithm-driven credit decisions are highly homogeneous, potentially leading to an overly optimistic collective expansion of credit supply during economic upturns and a collective tightening of credit during downturns. This "weather-storming" behavior significantly exacerbates the procyclicality of the economy, amplifies macroeconomic fluctuations, and poses a potential threat to financial stability. Therefore, recognizing the complexity and interconnectedness of these new risks is the primary prerequisite for building an effective governance framework.

5 BUILDING A RISK GOVERNANCE FRAMEWORK FOR FINTECH-ENABLED FINANCING OF MICRO AND SMALL ENTERPRISES

Given the complex risk profile presented by fintech-enabled financing for micro and small enterprises, constructing a multi-layered, comprehensive risk governance framework is crucial. The core objective of this framework is to achieve a dynamic balance between innovative incentives and risk control, ensuring the commercial sustainability of inclusive finance and ultimately maintaining the stability and resilience of the entire financial system. To achieve this goal, the framework must adhere to the fundamental principles of foresight, adaptability, synergy, and technological neutrality, aiming to form an organic governance system capable of self-optimization as the market and technology evolve.

At the foundational level of the governance framework lies the internal governance and risk control system of the fintech company itself, serving as the first line of defense against risk. Companies must establish a sound corporate governance structure, clearly define the ultimate responsibility of the board of directors and senior management in risk management, and formulate a clear "risk appetite framework" as the boundary and guideline for all business decisions. Guided by this framework, a closed-loop risk management system covering the entire process-pre-loan, during-loan, and post-loan-needs to be established. In the pre-loan stage, in addition to utilizing multi-dimensional data to build risk control models, a rigorous data verification mechanism and anti-fraud rules are also necessary. During the loan disbursement phase, dynamic credit limit management and risk pricing adjustments should be implemented, with real-time monitoring of changes in customer creditworthiness. In the post-loan phase, it is necessary to develop AI-based intelligent collection and asset classification management systems to achieve differentiated overdue management. Crucially, companies

should proactively apply compliance and regulatory technology tools, embedding compliance requirements into business processes to automate compliance reporting and real-time risk monitoring, thereby transforming compliance from a cost center into a core competitive advantage.

The effectiveness of internal governance largely depends on the clarity and suitability of the external regulatory environment. Regulatory agencies need to shift from traditional institutional supervision models to more inclusive and penetrating functional and behavioral supervision models. Regulatory sandbox mechanisms provide valuable experimental space, allowing fintech companies to test innovative products in a controlled environment, thus accumulating practical experience for improving regulatory rules while protecting consumer rights. Simultaneously, regulatory agencies themselves must vigorously develop "regulatory technology," utilizing big data, artificial intelligence, and other technologies to achieve penetrating analysis and real-time monitoring of massive market transactions, promptly identifying potential risk accumulation and abnormal behavior. Furthermore, promoting the development of unified data governance rules and industry technical standards is crucial. This not only breaks down information silos and mitigates the risk of shared debt but also lays a solid foundation for fair competition and healthy market development.

Beyond internal and external regulation, a healthy fintech ecosystem requires collaborative governance from multiple stakeholders and strong infrastructure support. The government should play a leading role in establishing or improving a credit information sharing platform covering the entire society, and legally incorporating alternative data generated by fintech platforms into the credit reporting system to fundamentally alleviate information asymmetry. Industry associations should assume responsibility for formulating industry self-regulatory conventions, technical ethics standards, and codes of conduct for practitioners, maintaining overall reputation and market order through industry self-discipline. Simultaneously, introducing independent third-party professional institutions, such as technology auditing, security assessment, and algorithm ethics review agencies, to objectively assess and supervise the risk control models, data security, and compliance of fintech platforms can provide credible verification for investors, partners, and regulatory agencies, forming a beneficial social supervisory force. These three levels support and closely link each other, jointly constituting a dynamic governance network that can stimulate innovation while effectively managing risks.

6 CASE STUDY: BUSINESS MODEL AND RISK GOVERNANCE PRACTICES OF MYBANK

To examine the theories and frameworks within a real-world context, this section uses MYbank as a typical case study for in-depth analysis. As one of the first internet banks established in China, MYbank has clearly defined its service tenet as "meticulous and thorough" since its inception, focusing on providing inclusive financial services to micro and small business owners, sole proprietors, and rural operators. Backed by the Alibaba ecosystem, it possesses a strong foundation in scenarios and data, making it an excellent example for observing the application of fintech in micro and small enterprise financing practices.

The essence of MYbank's business model lies in its digital credit solutions deeply embedded in the industrial ecosystem. It does not provide financial products in isolation, but rather seamlessly integrates credit services into the daily operations of micro and small enterprises, such as providing "borrow anytime, repay anytime" credit products in the merchant back-end of e-commerce platforms, logistics management, or supply chain systems. Its operation is entirely built on cloud computing infrastructure, utilizing big data technology to conduct multi-dimensional analysis of the massive amounts of non-financial data accumulated on the platform, such as transaction records, user reviews, and warehousing and logistics information. Then, through artificial intelligence algorithms, it constructs a unique

credit risk control model, achieving the "310" model (3-minute loan application, 1-second loan disbursement, 0 human intervention). The core value creation of this model lies in transforming the intangible "credit" of micro and small enterprises into tangible "credit lines," greatly lubricating the micro-circulation of the real economy.

However, this model, which heavily relies on data and algorithms, also exposes MYbank to a series of unique risks. Technically, it constantly faces challenges related to data security and model risks. If it suffers a large-scale cyberattack or if its algorithms misjudge due to drastic changes in the market environment, the consequences will be severe. Business-wise, its customers are mostly micro and small entities with weak risk resistance, and credit risk will be significantly exposed during economic downturns. At the same time, due to the lack of physical branches and a relatively weak deposit base, its reliance on interbank market funds necessitates continuous attention to liquidity management. Furthermore, its innovative risk control logic and business boundaries often touch upon gaps in the existing regulatory system, making compliance risks ever-present.

To address these risks, MYbank has built a distinctive risk governance system in practice. Internally, it has established a rigorous "risk preference framework," clearly defining its target customer groups and risk tolerance levels, and utilizing compliance technology to automatically embed regulatory requirements into the entire product design process. Throughout the pre-loan, loan, and post-loan stages, it continuously iterates its risk control models by introducing new data sources such as satellite remote sensing image analysis and payment network relationship graphs to improve the accuracy of risk identification. Regarding external environment management, MYbank actively participates in regulatory communication, is a frequent participant in innovative pilot projects such as inclusive finance and regulatory sandboxes and proactively collaborates with industry associations and third-party security institutions, accepting audits and assessments of its algorithm models and data security to enhance its public credibility.

MYbank's practices offer profound insights. Its success demonstrates that technology empowerment can indeed provide scalable and sustainable services to long-tail customer groups that traditional finance struggles to reach, proving the commercial viability of inclusive finance. However, its experience also warns us that risk governance in fintech is not a one-time solution. It must be a dynamic and evolving process, requiring institutions to establish an agile technology governance core internally, regulators to create an inclusive environment of "pilot-summarize-standardize" externally, and ultimately, it relies on a multi-party governance ecosystem jointly built by the government, industry, and the market, characterized by data sharing and clear responsibilities. The case of MYbank ultimately proves that only by viewing technological innovation and risk governance as two wings of a single entity, two driving wheels, can true long-term stability and success be achieved.

7 RESEARCH FINDINGS, POLICY RECOMMENDATIONS AND OUTLOOK

This study systematically analyzes the business models, risk composition, and governance framework of fintech-enabled financing for MSEs, drawing several core conclusions. The study finds that fintech has not changed the essence of finance, but rather revolutionarily restructured the cost, efficiency, and risk pricing logic of traditional financing services through technological paradigm shifts. Innovative models, such as digital lending and supply chain finance, have successfully shifted the focus of services from collateral and financial statements to the actual transaction behavior and ecosystem credit of enterprises, effectively reaching a massive long-tail customer base of MSEs that is difficult for the traditional financial system to cover, demonstrating the feasibility of inclusive finance in terms of commercial sustainability. However, this empowerment process has also given rise to and exacerbated a series of new risks, including technological risks arising from high reliance on data and algorithms, business

and systemic risks bred in interconnectivity, and compliance challenges brought about by innovation outpacing regulation. Therefore, while fintech addresses the "financing difficulties" of MSEs, it also pushes risk management into a more complex, multi-dimensional governance stage requiring the combined efforts of internal governance, external supervision, and ecosystem collaboration.

Based on these conclusions, this study proposes targeted, multi-level policy recommendations. For regulators, the key lies in finding a balance between innovation and stability. It is recommended to promote a shift in regulatory paradigms from institutional regulation to functional and penetrating regulation, actively utilizing regulatory technology to enhance the ability to perceive and warn of real-time market risks. The "regulatory sandbox" mechanism should be further improved and expanded to provide a safe testing ground for innovation, and the establishment of unified and standardized data governance and industry technical standards should be accelerated, particularly in areas such as data ownership, algorithm ethics, and information sharing, to clearly define the path for healthy market development. For fintech companies, it is crucial to recognize that risk governance capabilities are a core competitive advantage for long-term development. Companies need to move beyond simply pursuing technological efficiency, internalizing compliance and risk control as the core of their corporate culture, investing resources in building transparent and auditable algorithmic models, and proactively applying compliance technologies to embed regulatory requirements into business processes. Simultaneously, they should strengthen information disclosure and establish open cooperative relationships with regulators, peers, and third-party institutions to jointly maintain industry reputation and stability. For micro and small enterprises, it is necessary to guide them to improve their "digital literacy" and credit awareness. While enjoying convenient financial services, businesses should proactively standardize their operational data records, understand basic financial and risk knowledge, prudently assess their debt capacity, avoid over-financing, and learn to use legal and regulatory tools to protect their legitimate rights and interests in digital financial transactions.

Looking ahead, the practice of fintech empowering micro and small enterprise financing is still evolving dynamically, and many areas deserve in-depth exploration. Future research can focus on the following directions: First, in-depth exploration of the effectiveness boundaries of specific technologies in risk governance, such as how to effectively verify and ethically review complex machine learning models after the fact, and the actual cost and benefit assessment of blockchain technology in multi-party collaborative risk control. Second, with the development of new technologies such as the Internet of Things and federated learning, how to achieve safer and more effective credit information sharing while protecting data privacy—that is, risk control paradigm innovation under the "data available but not visible" model—will become an important topic. Third, the multi-layered governance framework revealed in this study needs to be tested in a broader economic cycle, especially exploring how to mitigate the pro-cyclical effects of fintech through counter-cyclical policy design and technological tools under downward macroeconomic pressure. This will be crucial for maintaining the stability of the entire financial system. This path of exploration is still long and requires the continued joint efforts of academia, industry, and regulators.

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